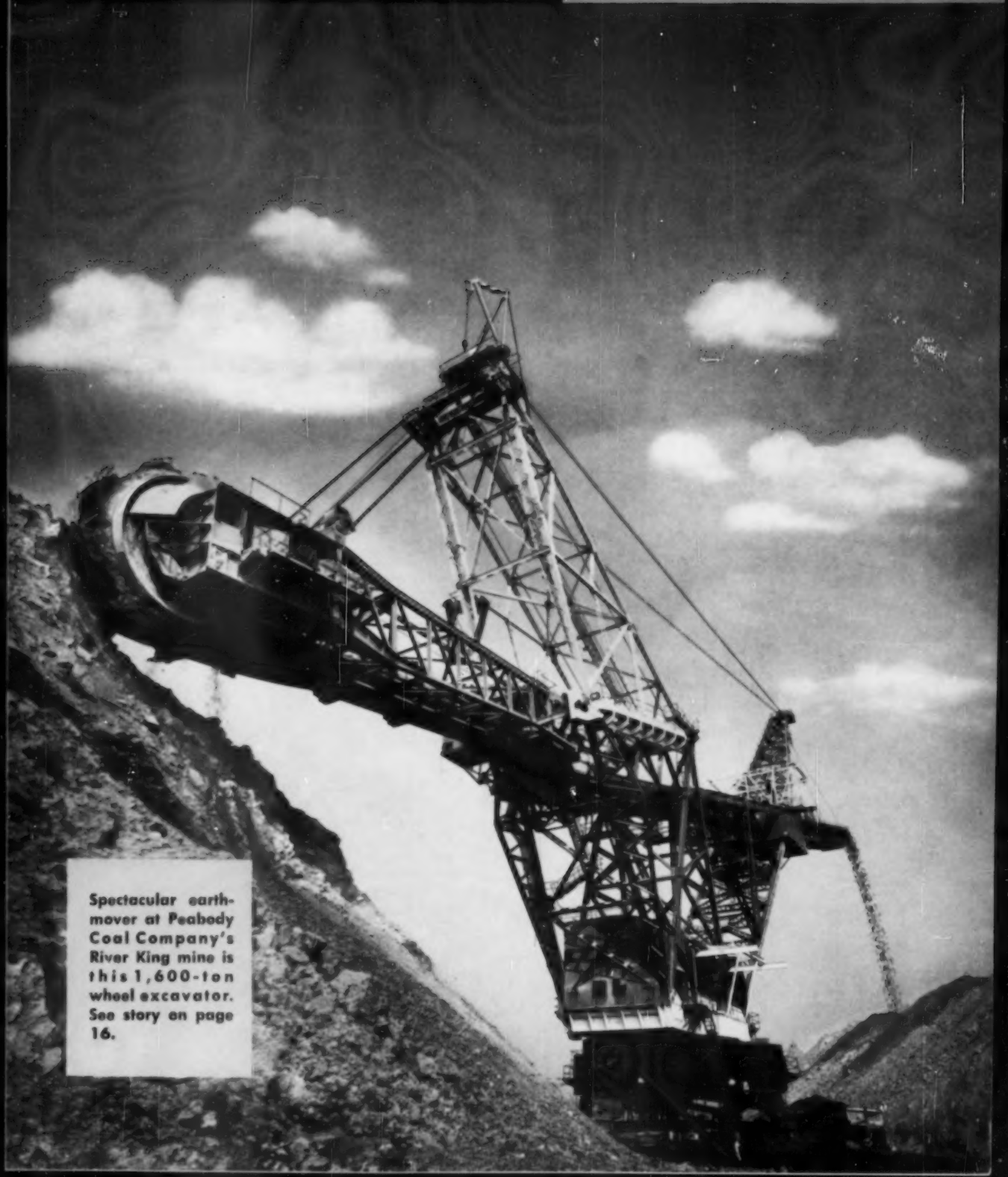
Excavating Engineer

founded 1905

DECEMBER
1960



Spectacular earth-mover at Peabody Coal Company's River King mine is this 1,600-ton wheel excavator. See story on page 16.

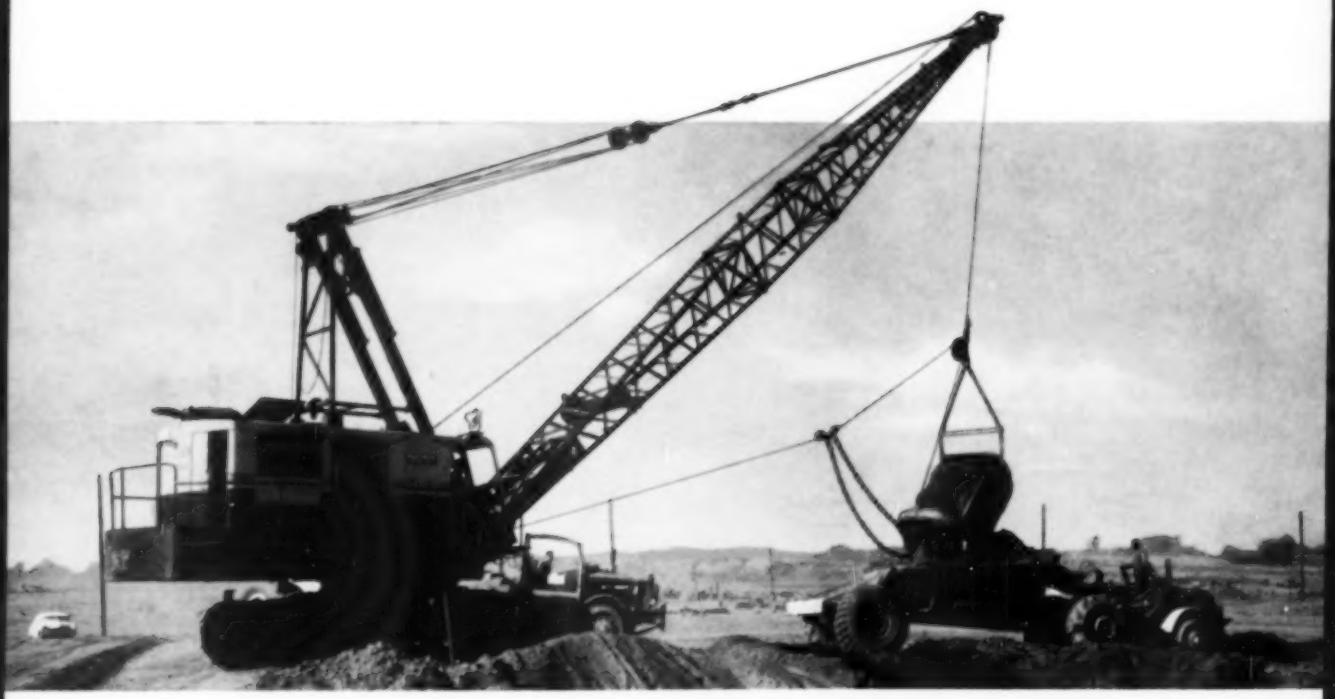
3½

4

5 YARD?

If you're ready to move up for bigger profits, check the new 71-B Series Two. Based on your application, this machine makes these capacities available as a shovel-dragline-hoe. The 71-B dragline shown is equipped with 70′ boom and 5-yard Bucyrus-Erie BM bucket. Get the facts: Bucyrus-Erie Co., South Milwaukee, Wisconsin.

36E60



BUCYRUS-ERIE

Excavating Engineer

founded 1905

South Milwaukee, Wisconsin

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H. A. BURKHARDT
Publisher

W. C. VAN DYKE
Sales Manager

W. E. WILLIAMS
Editor

F. C. GROTJAN
Assistant Editor

E. W. ARNDT
Art Editor

H. LINDQUIST
Staff Photographer

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meet the 14-B

SUPER

OUTLIFTS

OUTLIFTS

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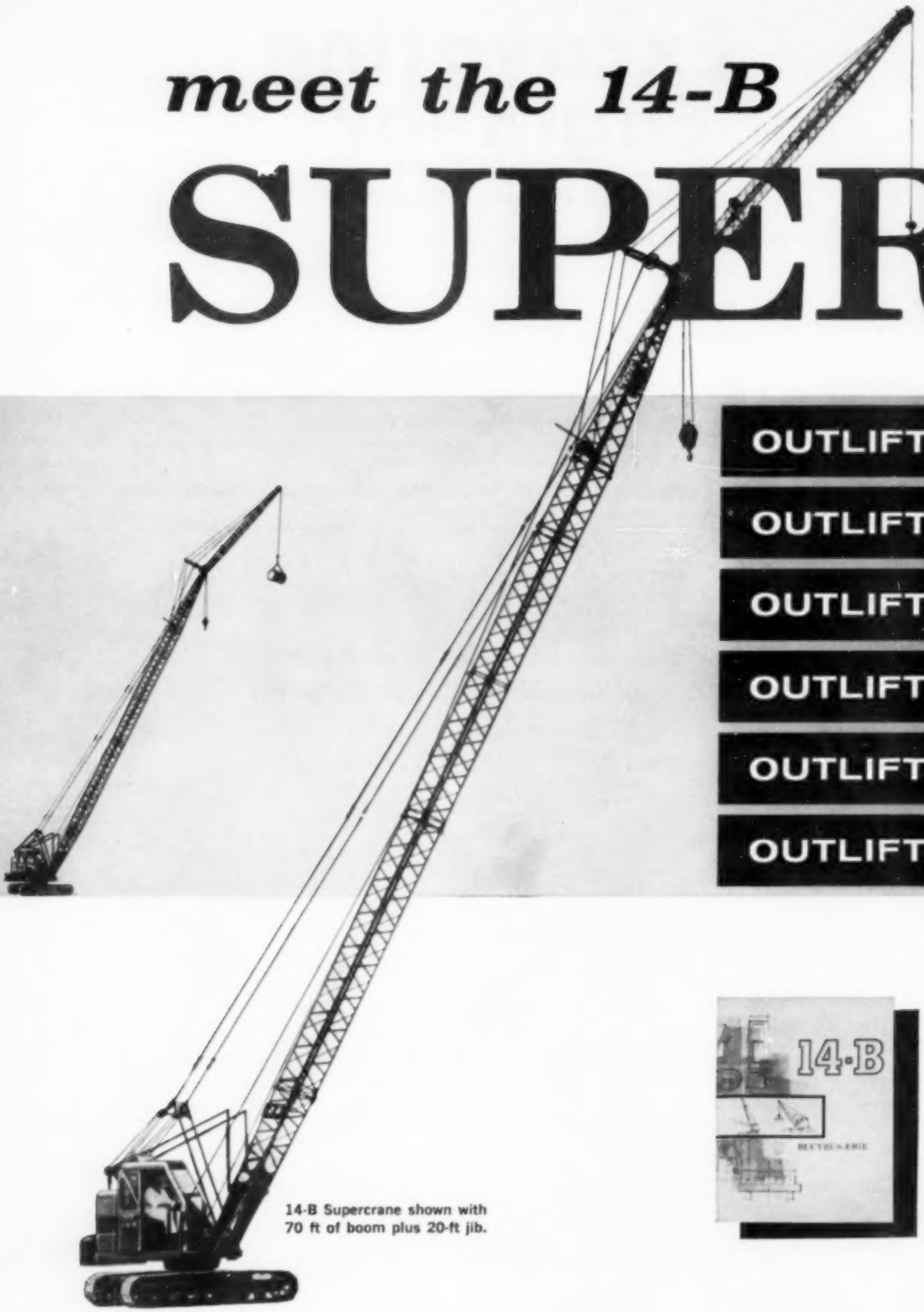


14-B Supercrane shown with 70 ft of boom plus 20-ft jib.

CRANE!

3/8-YD COMPETITOR "A" BY 19,250 POUNDS!

3/8-YD COMPETITOR "B" BY 14,000 POUNDS!

1/2-YD COMPETITOR "C" BY 19,000 POUNDS!

1/2-YD COMPETITOR "D" BY 11,500 POUNDS!

1/2-YD COMPETITOR "E" BY 11,000 POUNDS!

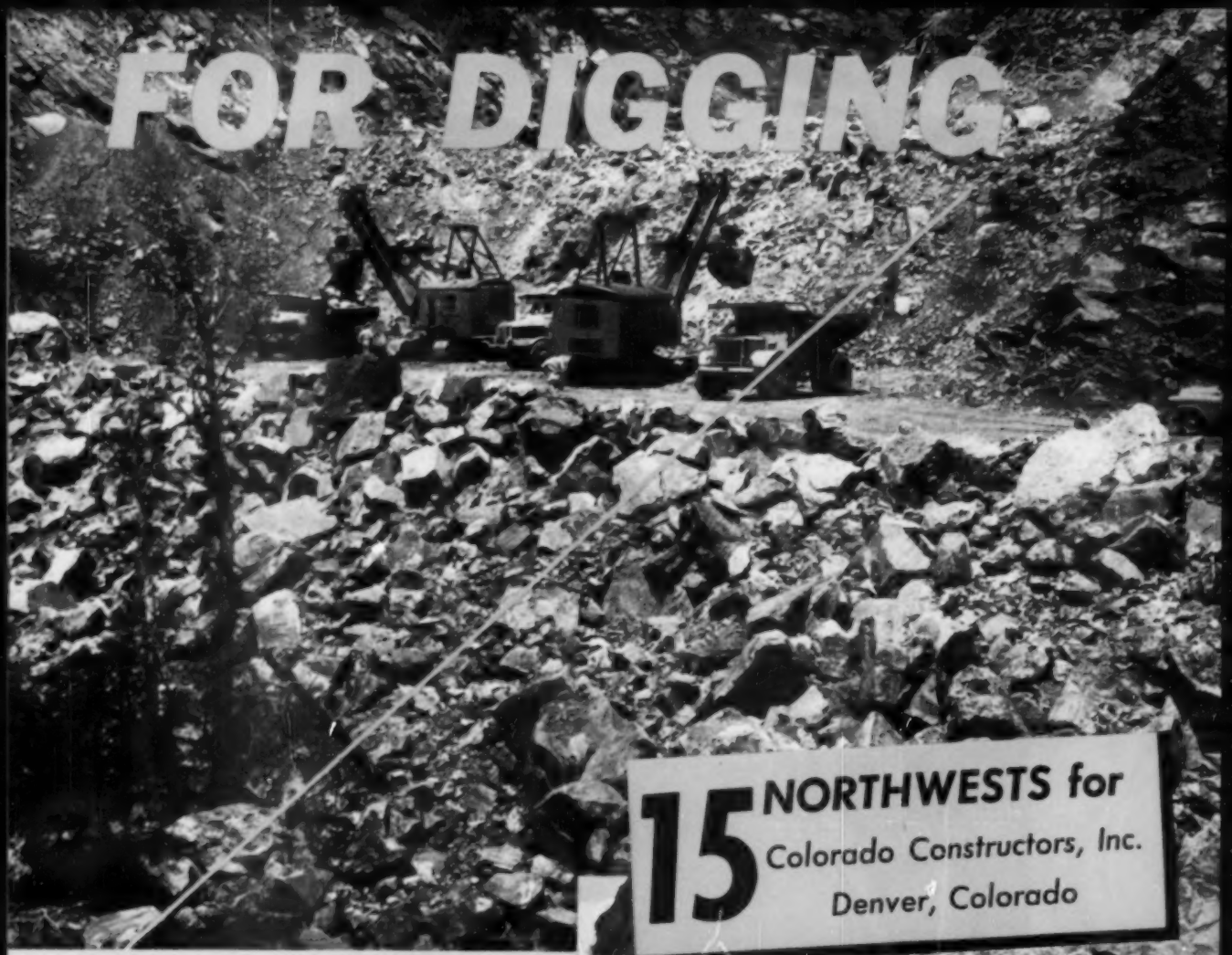
1/2-YD COMPETITOR "F" BY 10,000 POUNDS!

51E60

Check it! A Bucyrus-Erie representative will show you the facts — identify each of the comparisons above — present you with a complete, illustrated brochure describing all the startling new developments in the 14-B Supercrane or write Department COMPARISON, Bucyrus-Erie, South Milwaukee, Wisconsin.

BUCYRUS-ERIE

EX-LAFFS
GETS THE CHRISTMAS SPIRIT!
by Marvin TOWNSEND
WE WERE WONDERING, SIR. COULD US FELLOWS AND MISS CONRAD HAVE AN OFFICE PARTY THIS AFTERNOON?
MY WIFE WANTS TO BORROW IT AWHILE TO DO HER CHRISTMAS SHOPPING.
CHRISTMAS SPIRIT FUND
"IT'S TO BUY LIQUOR FOR OUR CHRISTMAS PARTY."
"HENRY JUST LOVES THE TIE YOU GAVE HIM, MOTHER."
SINCE WHEN DOES THE COMPANY HOLD A CHRISTMAS PARTY IN A SEWER DITCH?
WHAT'S THAT, BOSS? YOU POSITIVELY CAN'T SPARE ME TO GO CHRISTMAS SHOPPING WITH MY WIFE THIS AFTERNOON?
PLEASE, MR. SWART2! TELL ME THE BONUS CHECKS YOU PROMISED US ARE IN THESE NECKTIE BOXES!
Merry Christmas to all employees
EXCAVATING ENGINEER



15 NORTHWESTS for
Colorado Constructors, Inc.
Denver, Colorado

that separates the shovels from the toys

HERE's the kind of digging that breaks the heart of an operator with an ordinary rig under him. It's the type of digging that separates the *real* Rock Shovels from the toys. Two Northwest 80-D's are pouring it on to clear out the granite rock leading to a tunnel heading in widening U. S. Highway 40-6 near Idaho Springs, Colorado. The contractor is Colorado Constructors, Inc. of Denver and the new 80-D to the left is the fifteenth Northwest Colorado Constructors has bought.

Here are fourteen testimonials to performance in country where the backbone is Rock and only top performance can satisfy people like Colorado Constructors, Inc.

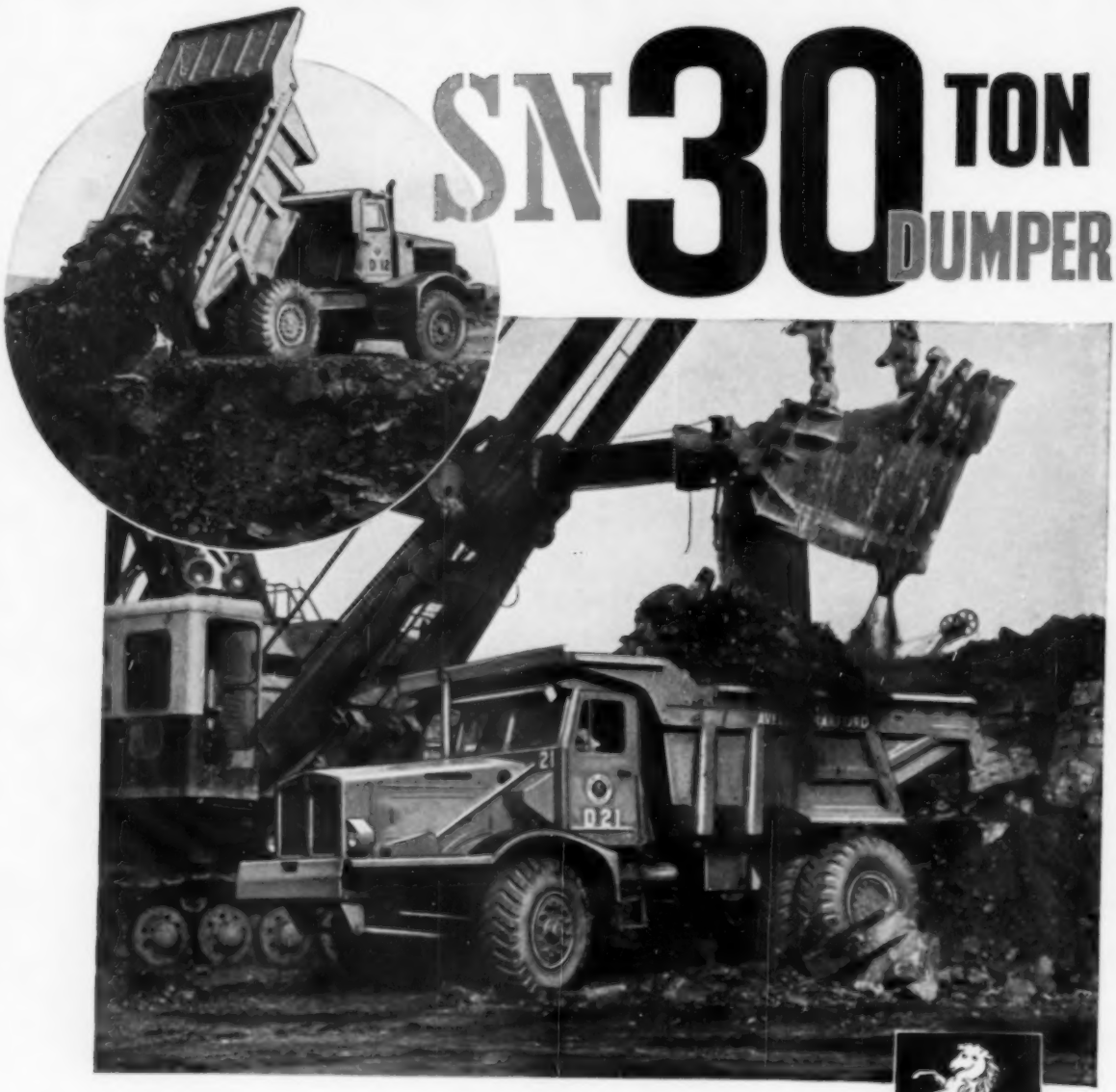
Your Northwest is a *real* Rock Shovel. It brings you the advantages that get the job done—the things that permit you to say, "That Northwest is always ready to go."

They are the advantages backed by the quality that makes the Northwest the finest machine of its kind.

NORTHWEST ENGINEERING COMPANY
1506 Field Building • 135 South LaSalle Street
Chicago 3, Illinois

S-80-12-LC

SN 30 TON DUMPER



Biggest and most powerful British-built off-highway earthmover, the Aveling-Barford 'SN' 30-Ton dumper is unmatched in capacity, power and speed. It has a 400 B.H.P. Rolls-Royce turbo-charged engine and optional transmissions giving 6-forward and one reverse speeds —top 30 m.p.h., or Allison Torqmatic No. CLBT5940, with four forward speed ranges and one reverse, top 33 m.p.h.

Its rugged body of high tensile steel is built to withstand heavy pounding of impact loading from big excavators and to resist the abrasive action of rock, iron ore or overburden constantly grinding over the surface as the load is discharged.

The 'SN' is easy to handle. Steering is power-assisted; brakes are air-powered, and the tip—hydraulically operated and fully controlled—can be held at any angle.

For full particulars write for Publication No. 1852.

INVICTA

AVELING-BARFORD LTD
Grantham
England

Aveling-Barford SN **30 TON DUMPER**

21 miles of plumbing

Averaging approximately 500 linear feet of pipeline each shift, a Marion 362 hoe is making child's play of a 6 ft. wide, 6 ft. deep drinking water pipeline in Oklahoma.

Over 189,000 cubic yards of earth, rock and sand will eventually be moved before the $1,372,000 project is completed in June, 1960. Big profit-making features such as famous Marionair control in combination with smooth, fast-acting clutches help keep cycle time to a minimum. Widely-spaced, non-clogging crawlers offer the best flotation... provide best weight distribution for hefty lifts.

These same fine qualities of stamina, dependability and speed are available in all machines in the Marion line, as you'll find out when you contact your nearest Marion distributor.

You get **MORE** *with* **MARION**

Marion Power Shovel Company, Marion, Ohio

A Division of Universal Marion Corporation

MILE-HIGH CALIFORNIA ROAD JOB

NEW TRACTOR-REALLY

Packs it in—two D8H Tractors, pulling and pushing, fill a 491 Scraper with hard-to-load breccia, a cemented gravel, in 45 seconds.

SCRAPER TEAMS PRODUCE

"A GOOD COMBINATION FOR THE ROUGHEST WORK"

TAKE boulders, volcanic ash and mud—mix well with decomposed shale—then add mile-high working altitudes, side-hill operation and unfavorable weather . . . these are some of the problems facing A. Tiechert and Son Inc. as they push a new highway through the Sierra Nevada Mountains in Eastern California. The job, 7.8 miles of freeway construction on State Highway 40, involves moving two million yards of earth in two five-month seasons. In spite of the obstacles, the Sacramento contractor holds the work to schedule, expects to complete the job on time this October.

Four D8 Series H Tractor-491 Scraper teams, push-loaded by D8s of the same series, set the pace for this difficult job. Because of the steep hill haul roads, they start the cuts and fills, then handle earthmoving on hauls up to 700 feet. DW21 wheel units take over on the longer hauls that range up to 7000 feet.

"The 491 Scrapers with D8s front and rear performed very well—especially in wet, rocky ground," says W. W. Staring, Project Manager. And he adds, "Operators and foremen especially like the 491 in rock because of higher apron clearance, excellent ground clearance and the good distance from axle to apron. In most cases we used D8-491 teams instead of shovels on shot breccia. It's a good combination for the roughest work."

On rugged big volume, short haul operations like this, Caterpillar track-type Tractor-Scraper combinations are the most efficient way to move earth. The new D8 Series H, for example, is over two tons heftier than the previous model, packs 23% more horsepower (235 flywheel HP), and with direct drive has a speed of 6.3 MPH forward. Team it with the 491 Scraper (34 cu. yd. heaped, 27 cu. yd. struck) or the 463 Scraper (28 cu. yd. heaped, 22 cu. yd. struck) for big capacity loads.

The finished product—traffic moves with speed and safety over a newly completed section of California State Highway 40.

Get all the facts—plus a profit-proving demonstration—on the new Caterpillar D8H Tractor and the 491 Scraper from your Caterpillar Dealer. He's ready right now!

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

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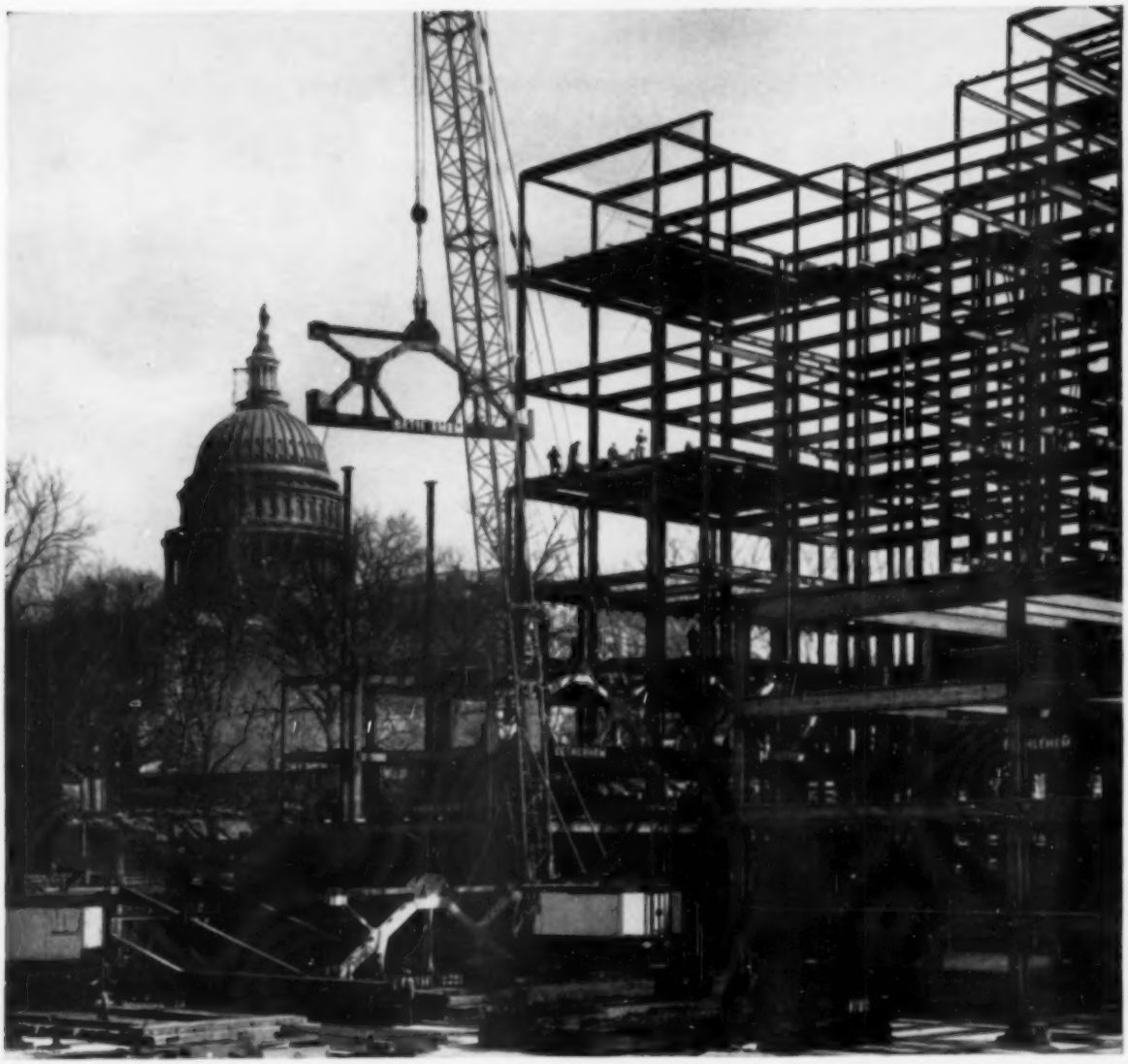
BORN OF RESEARCH
PROVED IN THE FIELD



GENERAL CONTRACTOR: McCloskey & Co.

Heavy truss gets ride on Capitol Hill

This 14-ton steel truss being raised into position is 36 ft long. It's one of 128 trusses being used in the construction of the House of Representatives Additional Office Building, in the nation's capital. Upon completion, the 9-story structure, with its 33,600,000 cu ft of space, will be the largest of the buildings occupied by the legislative branch of government.

Bethlehem Wire Rope was called upon for countless lifting jobs at this gigantic construction project. Day after day, as the steel went into place, this quality rope gave reliable, economical service.

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.
Export Sales: Bethlehem Steel Export Corporation

Wire Rope depots and distributors from coast to coast stock Bethlehem Rope

BETHLEHEM STEEL

Excavating Engineer

FOUNDED 1905

DECEMBER 1960

Big Shovel Spread Digs Yankee Expressway

Bold sign greets motorists on approaches to the DeFelice job. Signs like this are part of a concerted effort to "sell" the big road program.

BIG is the word for Connecticut contractor's way of handling a highway job. Decomposed granite and ledge rock prove burly shovels a wise choice.

MANY a project chief claims he runs a three-ring circus, but few can make as clear a case as James (Chip) Grillo, top push on L. G. DeFelice & Son contracts along interstate highway 84 near Danbury, Conn. A stroke of bidding fortune and a design quirk split his job into three separate stretches. Any one of the sections would stack up on its own as a full-size project. Together, they make a mighty panorama of modern digging power—big shovels and speedy haul fleets that keep the job pay-yards ahead of schedule even in this glacial terrain.

Part of the story behind the odd job layout lies in the ups and downs of the terrain. The rest, explains Chip Grillo, lies in the ups and downs of the figures at contract lettings. DeFelice won a 5-mile portion of I-84 from the New York state line to the outskirts of Danbury. They also took the 4-mile stretch where the route swings around the city. But they missed on a big interchange that lies between their contract sections.

From a well-stuffed plan rack beside his desk, job engineer John

Borrow-pit keeps a Northwest 80-D busy. Euc belly-dump takes aboard a payload, while Cat DW21 scraper waits its turn.

(Left) A 4-yd. 88-B shovel bites out a full dipper of spiny glacial soil. Note the shovel-runner's light grip on the rig's air controls. *(Right)* Belly-dump wagon lays a wide windrow of dirt. Cat D8 dozer follows through, spreading material.

O'Connor pulls out a sheet that details the second split in the project. His pencil traces a rough oval around a pretzel-like tangle of ramps and access roads.

"On our contract, this interchange area—around 40 acres big—straddles a broad valley," he explains. "Now maybe it would be possible to find the million yards of borrow close by, but local real estate comes pretty high.

"Up the line a bit," now the pencil scoots way out to the corner of the print, "I-84 runs into some heavy cuts. Too much dirt there, not enough here. Well, you know what the state highway engineers decided to do? They tacked a mile of that built-in borrow onto our contract. We get the fill dirt; they get a graded right-of-way. Everybody's happy, except maybe the drivers on that vexing 12-mile haul."

Vexed drivers are nothing new around Danbury. Today, long lines of cars crawl through its downtown congestion. Tourists fret away weekend hours stalled in narrow streets.

"Just be patient," say the city fathers. "With the I-84 bypass finished, traffic flow will open up wide."

For officials are anxious to hold onto Danbury's claim to its spot as the "Gateway to New England," They scoff at like claims made by downstate satellites of New York City. Tourists caught in its traffic turmoil tend to be more candid.

"Gateway?" they jest, "why it seems more like the neck of an hourglass."

Which comes close to the truth. Traffic on two main arteries of downeast commerce (US 6 and US 7) meets on the city's streets. The two highways merge on one side of Danbury, then split again on the opposite side. The Yankee Expressway (as I-84 has been labeled locally) swings north of the city center in a broad loop that connects the two junctions. DeFelice's contract includes the big interchange hook-up on the east side of town.

Creates New Route

The bypass pioneers a new route across the Berkshire foothill ridges that dip toward the city. As John O'Connor points out on the profile sheet, the gentle grades of the expressway wing smoothly across the roller-coaster terrain.

"The plans tell only part of the story," he says. "When you get out in the cut and see those spines of ledge rock you know why digging is a foot-by-foot challenge through here."

Excavating Engineer took a close look at the machines licking that challenge in the big cuts north of the city —the center ring of Chip Grillo's busy "circus." The contract here calls for over 1,500,000 cubic yards of common excavation, which figures to run over 20% rock.

With a savvy born of years in the field bucking the flint-hard ledge rock backbone of this area, Chip Grillo pegged this job as a natural for shovels—big ones. It's not so much the size of the cuts (the largest one will run 60 feet deep, yield 500,000 yards of dirt) as the certain knowledge that the rolling hills hide some mighty hard digging. There may be other ways to handle this rocky soil, but in the long run none as cheap or as fast as heavy-duty shovels.

Mike Romei, superintendent on the job, points to the face of a big cut where two of the shovels work. They swing through their cycles smoothly, tearing loose chunks of rock with apparent ease.

"Looks like a cinch in here, doesn't it?" Romei asks. "Well, don't kid yourself. As any Yankee farmer knows, if a rock doesn't move the first time you nudge it, better get set to blast."

Romei crumbles a lump of the gray soil under the sole of his field boot. This is decomposed granite, he explains. Also a problem rock for an

Far-out section of I-84 (six miles from the main DeFelice contract) supplies dirt for a big interchange fill. This 3½-yd. shovel loads out one of the International ten-wheelers.

excavator. In place, a tough shooting-kind of rock. It softens up fast, though, once exposed for a few days.

Blast it out? No need to run up yardage costs that way, job brass reasoned. Not when shovel power—and a smart digging plan—could turn the trick. As it worked out, the shovels were able to handle over two-thirds of the rock removal on their own. Spot blasting loosened deposits of schist, gneiss and ledge rock for faster loading.

Layout of the excavation hits you as different the moment you see it. The two shovels work separate faces on either side of a broad cut. The object—to expose as much of the granite as possible for faster weathering. Here's how it works. The shovels pioneer a cut straight through the ridge on each lift. Then, in later passes, they widen the cut to full size —shaping side slopes as they move forward. This digging plan turned in an unexpected bonus. The through cuts open a rough, but usable, haul road over much of the right-of-way. This helps hold down haul distances. Spoil can be moved quickly to fill areas where it is needed.

From a vantage point atop the cut you get the smooth pattern of digging progress best. Almost directly beneath, a Bucyrus-Erie 88-B shovel swings a heaping 4-yd. dipper load of rock toward a waiting Euc belly-dump wagon. At the other end of the cut, a 71-B seems to brace itself hard against the ground as the shovel-runner crowds the dipper into the 14-ft. high bank.

Quick Shovel Loading

The shovels work a tight quarter-swing cycle as they advance the length of the cut. The haul fleet drivers can see both shovels as they roll in. This gives them time to make their turn to come under an open shovel. No waste time backing and spotting here. The haul units turn, pull in alongside the shovel, load up, and take off straight away.

The two shovels, loading out a fleet of eight Euclid bottom-dump wagons (20-yd. heaped payload) and four Euc rear-dumps (22-ton rating), hit a steady pace that averages around 6,000 bank yards a shift. On the best day, the shovels clocked a record 14,000 cubic yards in two shifts. At that time the haul fleet ran a 1½-mile round-trip cycle.

Rock in one form or another cropped up almost everywhere the shovels worked. One cut near the center of the section proved to be a rich lode of tight schist and gneiss. Almost 175,000 cubic yards of rock blasted from this cut went into the base of the big fill on the east end of the job. Dirt from other cuts, spread in 12-in. lifts, topped out the broad embankment. No sprinkling problem here. The soil carries optimum moisture as it is dug. Fast action by Cater-

Powderman tamps charges into a blast hole as crew gets set to loosen rock for a drain pipe trench. Backhoe scoops out spoil after EB caps trigger the shot.

Drill tender gives the three-o sign as chattering bit sinks blast hole in rock outcrop. Tractor-drill is completely self-contained from air compressor to hydraulic jibs.

pillar dozers spreads out the dirt for tight compaction under haul truck traffic.

DeFelice subbed structures on this contract section to W. J. Megin, Inc., of Naugatuck, Conn. This work includes eleven major bridges and ten box culverts—one a super-size twin 10 x 10 feet in cross section, 900 feet long, calling for 8,000 cubic yards of concrete.

Truck cranes form the core of Megin's fast-stepping building team. The heavy-duty lifting power lets crews prefab most bridge components conveniently—and safely—on the ground. Then a P&H truck crane takes over to spot the complete rebar assembly (or cap beam form, or bucket of concrete, or workers' platform) right where it is needed.

On the leg of I-84 reaching to the New York state line—the west ring of the big show—digging isn't as rugged, but the shovels are. The idea here is to raise fills fast to get equipment out of the wet sloughs that cross the route. Scrapers handle some of the dirt stripping in this rolling hill country. Big shovels, however, set the pace on cuts that dip into rock, and in the borrow pit.

While there is still a lot of excavation in this stretch (about 700,000 yards in all), there is less rock—only 50,000 yards. Almost 300,000 yards of borrow will bring the embankments up to grade.

A Bucyrus-Erie 88-B shovel sparks dirtmoving on this section. The 4-yd. dipper crowds easily through the tight soil, tearing out basketball-size boulders and chunks of decomposed granite for fast loading. Working also on the through-cut plan, the 88-B handles an average of 3,500 bank yards a shift. A fleet of four Euc belly-dump wagons makes the 1½-mile cycle to the fill in just under six minutes, even on the rough haul roads.

Borrow Pit

In the borrow pit, a Northwest 80-D shovel loads out Euc wagons and Cat DW21 scrapers. The pans work under the shovel when stripping slacks off. They have proved to be effective haulers—the wide tops make a good target for the shovel, travel speed is high, and the pans get even spread as they unload on the fill.

Hard rock posed a real blasting problem on both DeFelice contract sections. Shooting ledge rock is a ticklish affair even under the best conditions. It's hard to figure breakage planes, since the rock surface is rarely smooth enough to lay out a hole pattern. To add to the hazard, homes and roadside stands crowd close on the right-of-way.

The powder gang plays it by ear all the way. They gauge their charges to get dipper-size breakage, but only if there's no risk of peppering close-in homes with shot rock. The job

(Left) **Dipper-size chunks of rock are gouged by 30-B hoe.** ***(Right)*** **Spoil material is piled high by Michigan 180 loader.**

safety record speaks for itself. No errors, no hits, and darn few complaints from the neighbors. The blast hole crew on this job can really claim, "Have gun, will travel." Tractor drills give them plenty of get-up-and-go for the scattered shot hole work. Whether it is for one hole in a big boulder or a couple of dozen in a knobby outcrop, the drills move in and set up in only minutes.

The tractor drill remains one of the few home-made equipment ideas that caught hold, because it filled a real need for drillers who had to move often—and fast. Here's the recipe: Take one well-used tractor, still serviceable. Tail mount an air compressor behind the operator's seat. Up front, add a couple of stingers—ram-controlled booms that hold a drifter assembly stripped from a wagon drill. Presto: A versatile tool for hit-and-run blast hole work.

The beauty of the tractor-drill is its set-up speed, even in mountain goat terrain. Watch the cat-skinner zero in on a chunk of ledge rock that juts above grade. He nestles the front end of the rig snug against the stone. The drill tender then grabs the controls on one of the stingers. Hydraulic "muscles," powered by a power-takeoff-driven pump, quickly swing the mast around, then plumb it over the rock.

In one deft motion, the tender locks the steel in the Joy drifter and slams open the air valve. The carbide-insert bit chews into the rock, spitting a cloud of dust and chips. Seconds later, the other gun is in action too. The tail-mounted Ingersoll-Rand 600-cfm compressor supplies plenty of air for both drills.

The powder monkey follows through, setting charges close on the heels of the drill crew. He drops sticks of Red Cross 40% strength dynamite into the holes. EB caps trigger the shots, which are closely controlled to hold down noise and throw.

Deep Drain Pipe

The tractor-drills showed up especially well on line drilling to shape trenches in the rock cuts. Drain pipe went as much as 15 feet below grade, often through solid rock. The drills opened holes on both sides of the trench at one time, saving an extra set-up. After the powder gang pulled the shots, backhoes opened the trench to grade. A Bucyrus-Erie 30-B and a Northwest model 6 drew the digging assignments.

DeFonce Construction (Bridgeport, Conn.) subbed the structure work on this section of I-84. The plans call for one box culvert and five major bridges. Using a team of P&H truck and crawler cranes to speed pile-driving, the sub put in footings for all the spans, and started on superstructures during the 1960 work season. A Vulcan No. 0 air-powered hammer socked in steel bearing piles to depths of 40 feet for the expressway bridge that spans a New Haven Railroad branch line.

With one major change, DeFelice stuck with its successful digging plan on the mile-long section of I-84 that supplies the borrow for the big interchange. The shovels are there. But they load out a haul fleet geared for long-distance over-the-road service. The winding country road that connects the borrow area and the fill is like a superhighway for the ten-wheelers after they pull out of the rough cut area.

Ground conditions in the heavy cuts run about the same as on the other contract sections. If anything, there is less rock. The rich loam breaks out easily and loads fast. Shovel-runners, though, don't try for that extra yard or two atop the heaping truckload. They play it smart to avoid spillage on the public roads—a real clean-up nuisance and public relations problem, too.

The ten-wheelers (there are 25 Mack and International trucks in the fleet) load under a Northwest 80-D or a P&H 1055. The 80-D wields a 2½-yd. dipper; the P&H handles 3½ yards. With everything clicking, the shovels have hit an 8,000 yards-a-day pace (two shifts). The haul averages around 12 miles for the round trip.

Pave Next Year

Next season paving spreads will take over from the grading crews. Plans call for a double-barrel highway with two 12-ft. lanes in each direction on the main stem. In all, DeFelice will lay about 67,000 cubic yards of 9-in. thick reinforced concrete pavement. The job is scheduled for completion in November 1961.

In addition to Project Manager James Grillo and Superintendent Mike Romei, personnel on the job includes Felix Diguisto, equipment superintendent, and Louis Mazzagane, master mechanic.

Two shovels in a rock-filled dirt cut—this 88-B and a 71-B—move 6,000 bank yards a shift. Quarter swing cycle lops seconds off the loading time. Few cuts require blasting.

***(Below)* Complete re-bar mesh for column cap is hoisted into position by a P&H truck crane.**

New 1054-WX wheel excavator creates a massive shelf as it cuts away the top of the highwall. It spoils dirt 400 feet.

New Stripping Team Tackles Deep Overburden at River King Mine

Latest wheel excavator in the United States operates with a 70-yd. shovel to uncover coal 100 feet deep at Peabody Coal Co. mine in southern Illinois. Mine output will jump by a million tons annually.

WHEN overburden in coal strip mines becomes so deep that a large stripping shovel cannot dispose of it properly to maintain a workable pit, a second excavator must be sent in to assist.

Often this second excavator is a walking dragline which works on top of the spoil pile where it is used to pull back part of the material put there by the shovel, thereby making more room for additional spoil material.

This was the situation until just recently at the River King mine of Peabody Coal Co., located at Freeburg, Ill., in the famous Belleville coal district.

The River King mine employs one of the world's largest stripping shovels —a machine with 70-yd. dipper capacity—to dig overburden ranging from 65 feet to more than 100 feet deep. Even with its massive dumping height and reach, the 70-yd. machine ran into difficulty with the deeper overburden banks. The top of the highwall at the mine is soft and inherently unstable. Loam, clay, sand and gravel form the upper strata of the overburden. These materials tend to make the highwall cave in and slough into the pit.

Slides also occured on the opposite side of the pit, where the soft top material was mixed with heavy rock overburden in the spoil piles. During heavy rains, spoil slides were common.

A large 1250-B walking dragline with 200-ft. boom and 30-yd. bucket helped alleviate the problem by trimming the spoil slopes and cutting down height of the piles.

Sitting on top of the spoil pile, the "pull-back" dragline did nothing to increase the amount of coal being uncovered since it merely rehandled material dug previously by the stripping machine. The operation was costly—there were two machines to operate and maintain, two sets of operating

The excavator moves itself on four sets of hydraulically-leveled crawlers mounted at each corner of the base. It is driven by a number of electric motors which vary in size according to the power requirements.

This machine, working in conjunction with the 70-yd. shovel and other equipment at the mine, will increase coal production by a million tons per year.

The River King mine is one of Peabody's larger strip mines. Production began there in August 1957. The coal seam being mined is Southern Illinois #6, a rich, high quality formation which runs 5½ to 6 feet thick.

Big Producer

Peabody Coal Co., whose headquarters are in St. Louis, Mo., is the nation's second largest producer of bituminous coal. During 1958, its production was about 26 million tons from 29 mining operations. Most of it was sold to electric utilities for steam power generation. The company has 2 billion tons of proved coal reserves strategically located in rapidly growing mid-America.

"The wheel excavator is going to solve a tough pit problem for us and will be a wonderful asset," says James P. McDowell, Peabody's superintendent of Illinois strip mines. "During the next 10 years," he said, "the coal industry will see a lot of wheels in this country where the rock portion of the overburden isn't too high."

McDowell, who supervises operations of a large group of strip mines from his headquarters at the River King, pointed out the nature of the overburden at the River King mine makes it possible for the wheel to be applied to the job.

"A thin layer of limestone occurs throughout the area about 42 feet above the coal seam," he said. "This hard strata is of uniform thickness and very level. Above the limestone layer, the overburden is very soft material although it contains occasional boulders of varying size."

Below the limestone, there are tougher consolidated strata of hardpan, weathered limestone, shale and slate.

McDowell emphasizes that the wheel excavator output must be balanced with that of the Marion type 5760 shovel, its working companion in the pit.

Peabody has named the Marion crews, but only one of the machines was actually uncovering coal.

Peabody Coal Co. officials looked for a more economical solution to the stripping problem. They believe they have found it in a new wheel excavator which went into operation at the mine in August. The giant multiple-bucket excavator now works in tandem with the 70-yd. shovel which strips the lower and usually harder strata of the overburden. The digging wheel of the conveyor machine takes off the top layers, burrowing into the soft material like a giant mole.

The Peabody wheel excavator is a Bucyrus-Erie model 1054-WX. It is the latest and one of the largest machines of this type to be put to use in this country.

The new excavator weighs over 3 million pounds and stands 176 feet high. It digs material on one side of the open pit and carries the dirt by conveyor system to the spoil area some 400 feet or more away. The digging wheel itself is 24 feet in diameter and is equipped with nine buckets which dig as the wheel rotates. A 54-in. wide conveyor belt then carries the material away at speeds in excess of 1,000 feet per minute.

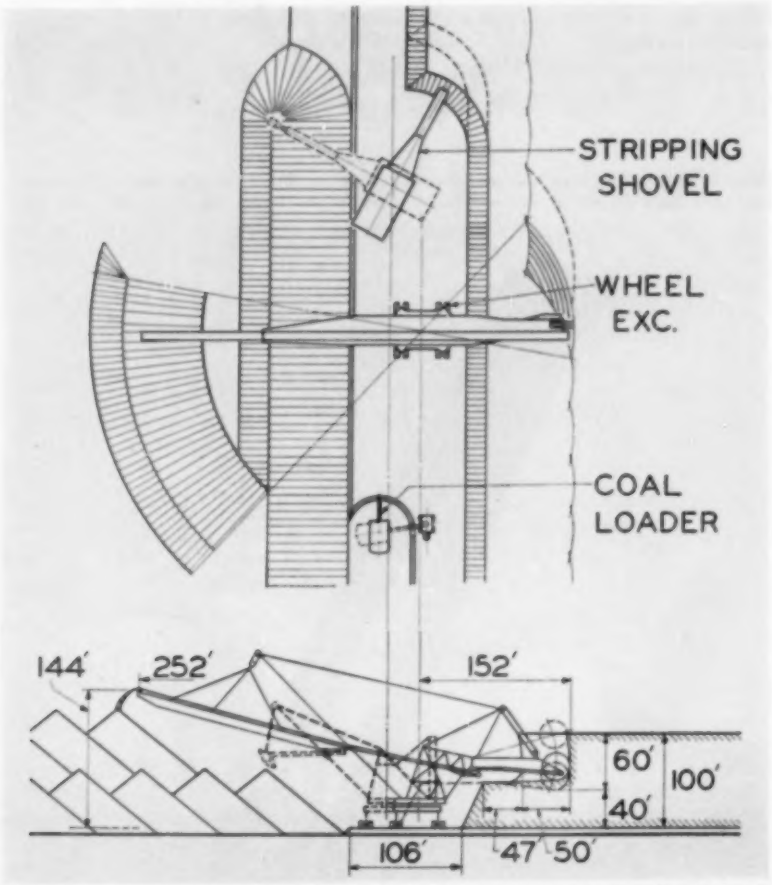
Working in tandem with the wheel is *Big Paul*, a 70-yd. Marion shovel. It strips the lower hard layers of the overburden while the wheel takes off the soft top.

shovel *Big Paul*, the "King of Spades." Swinging a 70-yd. dipper, the machine digs, hoists, swings and dumps a 105-ton bite in 50 seconds. *Big Paul* towers 148 feet in the air from the ground to the tip of the boom.

Big Paul has a dipper handle length (including dipper) of 83 feet 3 inches. Crowd handle length is 59 feet. Its working weight including ballast is 5,790,000 pounds.

"The wheel will have to move 2,000 yards per hour for us to maintain an efficient operation," McDowell said. Overburden in the mine ranges in depth from 65 to 135 feet. The wheel was specified to dig the upper third of the overburden which has an average height of about 85 feet. From this height, it usually digs down to a point about 60 feet above the coal, although it can go down as far as 40 feet from the coal seam. Under the usual stripping arrangements at the River King mine, the shovel takes the lower 60 feet of overburden remaining after the wheel excavator has removed the overburden exceeding that depth. The wheel stripping at an average rate of 2,000 yards per hour, would account for approximately 1,200,000 yards per month.

Jim McDowell *(right)*, general superintendent of strip mines in Illinois for Peabody Coal Co., talks over the wheel's performance with G. F. Haldeman, B-E erecting engineer.



Normal pit setup puts the shovel in the lead, digging the bench of rock which the wheel excavator has left behind on the previous pass down the pit. The wheel follows, digging a new bench; at the rear is the loading shovel taking out 45 feet of coal.

During the month of August last summer *Big Paul* moved 2,365,000 yards of overburden, according to Supt. McDowell. The shovel can move 3,500 yards per hour in good digging. Assuming the shovel and wheel must maintain a 2 to 1 ratio of material each moves, the wheel excavator must not drop below 1,750 yards per hour to keep up.

The depth to which the wheel strips varies with the type of material the stripping shovel has to handle in various parts of the mine.

If the wheel gets too far ahead of the stripper, it takes a deeper cut until the two machines are closer together in their respective schedules; and if the stripper is working faster than the wheel, the 1054-WX takes a shallower cut to enable it to get far enough ahead of the stripper to keep an efficient working arrangement.

Both the wheel and stripper work 24 hours a day on three shifts—seven days a week. Both the machines are greased while in operation.

A pit width of 130 feet is maintained, with 45 feet of coal taken out at a time. This width is necessary to provide adequate passing room for the shovel and wheel excavator. The

wheel requires 45 feet; the shovel 50 feet of clearance.

The typical arrangement of machines in the pit puts the shovel in the lead. The 70-yd. stripper works ahead and strips the 60-ft. high (plus or minus) bench which the wheel has left behind on the previous pass down the pit. *Big Paul* dumps the material in the area where the coal was removed on the previous pass.

Following behind the shovel is the wheel digging a new bench about 50 feet wide. It digs and spoils continuously while it swings across the cut. When reversing the swing at the ends of the cut, the digging ladder is advanced about one foot. By adjusting the swing speed, the operator controls the volume of material going into the buckets.

The coal loading shovel follows the wheel, and loads into Euclids which haul to the tipple.

Material dug by the shovel is quite hard and it must be blasted before the shovel can handle it. This is done by vertical drilling with rotary blast hole drills, although the Peabody management is currently considering use of horizontal boring rigs.

After the top of the bank has been cut down by the wheel excavator, blasting crews shoot the remaining overburden and get better fragmentation of this rock with the use of less explosives. The digging is easier and better shovel efficiency results. The shovel efficiency also improves when the machine digs against a lower bank. Overburden from the bank (which swells approximately 25% in the spoil pile) can then be dumped on the fly by *Big Paul* because no spotting of the load is necessary.

Buckwall Holds Slides

The shovel's hard spoil forms a buckwall which acts as a good retaining wall for the softer and less stable clay and sandy material which the wheel then spoils behind it. The buckwall eliminates serious slides of the spoil which were often experienced in the past at this mine.

By placing the upper strata of overburden on top in the spoil pile, the reclaiming cost of stripped land should be less, because it can be leveled with a minimum amount of dozer-pushing and restored to farm or forest use.

On the high wall side of the pit, another benefit occurs. The bench which the wheel digs stops the material normally sloughing off the wall from ending up in the pit. It comes to rest on the bench, from where it is removed during normal course of shovel stripping. Without this bench, the material would slide all the way into the pit, forcing the shovel to backtrack and make some cleanup passes.

The ability of the wheel to take off the top layer and spoil it far beyond the peak of the first spoil pile will mean these two important operating gains:

First, drills will operate on a lower level directly on the hard material they must penetrate; previously they drilled through the clay and granular material portion of the overburden also.

Many months of the year, the high wall is a soft, soggy mass of material softened by rainfall. In the past, three 50-R electric rotary blast hole drills were required for the overburden preparation chores. Chief problem for the drills was not the actual hole cutting time, but move-ups that were extremely difficult with the rigs wallowing in mud. Now, however, the wheel excavator removes the upper part of the overburden, making it possible for the drills to work from the shelf of tough rock material left behind for the stripping shovel to remove. The lower working position now eliminates the necessity of casing each hole and makes move-ups a simple matter in all types of weather. It is

(Left) **Electric-powered rotary blast hole rig drills 10⅝-in. diameter holes in limestone and shale overburden.** *(Right)*

Fuel oil from tank is used to saturate 80-lb. bags of ammonium nitrate which are poured in a free flow into the holes.

Clean-up dozer for the stripping shovel is this Caterpillar D7 which pushes spilled material against the bank for loading. It also sweeps the pit floor free of broken rock for the haul trucks.

expected that one or two of the drills will be freed by the timesaving.

Second, equipment formerly needed to rehandle spoil has been eliminated. Where previously a large 30-cu. yd. 1250-B walking dragline was needed to pull back the material deposited by the stripping shovel, it has now been freed from these duties. Right now the dragline is opening up a box cut 80 feet in depth to lengthen out the pit a half mile. The existing pit is one mile long.

Electric-powered Bucyrus-Erie 50-R rotary type drills handle the overburden at River King. Each drill works three shifts, seven days per week to hold pace with the big stripping equipment. Each drill has a three-man crew made up of a driller, driller helper, and shooter.

Blast holes usually are drilled on a 27 x 27-ft. spacing. A rotary 10⅝-in. diameter W7R-J Aerojet Tricone bit is used to complete the hole.

Before the arrival of the wheel, crews drilled an average of 250 feet of hole per shift. This average has now gone up to 500. Bit life varies from 5,000 to 15,000 feet depending on the hardness of the rock.

Only the bottom 45 to 50 feet of hole are loaded with powder; the remainder of the hole is stemmed to the collar.

Dry holes are filled with oil-treated ammonium nitrate prills directly from original 80-lb. paper bags. Damp holes are loaded with the nitrate and oil mixture packed in a polyethylene bag. Wet holes are loaded with special waterproof gelatin dynamite packaged in water-resistant cartridges.

When ammonium nitrate prills are used, approximately 800 to 1,000 pounds of the pellets are loaded into each 10⅝-in. diameter hole. About one-half gallon of fuel oil is pumped into each bag of powder from a tank on the drill prior to emptying.

A primer cartridge of 40% Olin Mathieson special gel dynamite is used to detonate. Holes are tied in with reinforced plastic Primacord and shot with one cap—an Olin Minimac delay cap. About 6 to 8 holes are shot at a time. DuPont 9MS connectors are used between holes.

Powder Factor

An average of 3½ cubic yards of overburden are broken per pound of explosive used.

Overburden is stripped right down to the top of the Southern Illinois #6 seam which runs 5½ to 6 feet thick.

Cat No. 12 grader smooths the haul route in the pit as a tank truck sprinkles water.

(Left) **A 170-B electric shovel takes out the coal seam, which runs up to 6 feet thick.** *(Right)* **Here is its 10-yd. dipper.**

The coal bed undulates, dipping as much as 5% in some areas. After the coal surface is cleaned by dozers, the coal is shot before being loaded.

A minor amount of drilling is required to break the coal seam. The River King uses a Paris auger rig to put down 2½-in. diameter holes. Into each hole goes a stick of 1¾ x 6-in. Olin Mine Gel #2 (a semi-gelatin dynamite) and a No. 6 cap, plus a quart of fuel oil and enough ammonium nitrate to partially fill the hole. Holes are drilled on 8-ft. centers. Each hole is fired individually.

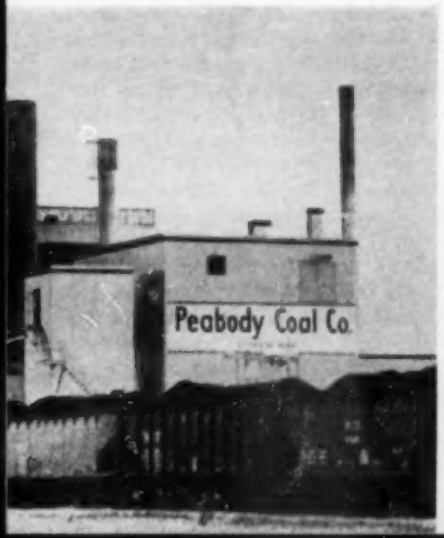
Doris Lanier, chief electrician at the River King mine, also serves as drilling and blasting superintendent. Howard Herzog is general drilling and blasting superintendent at Peabody properties in the Belleville area.

The seam is loaded out by an elec-

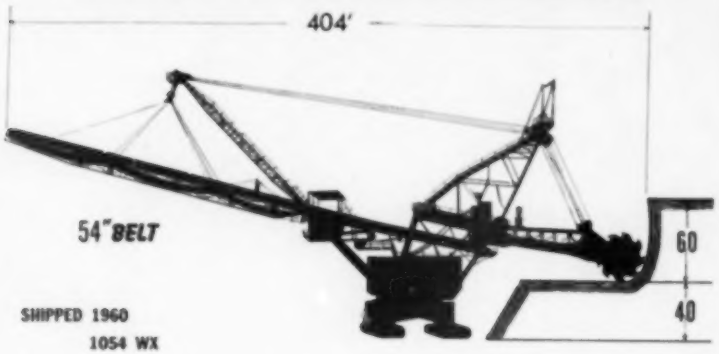
Continued on page 22

(Above) **Euclid 29TDT bottom-dump coal hauler moves on well maintained crushed limestone road.** *(Below)* **Coal is belly-dumped on stockpile adjacent to the breaker.**

(Below) **Washing and preparation plant has a capacity of 1,200 tph.**



PEABODY WHEEL EXCAVATOR



Specifications and Performance Data

GENERAL	
Over-all length (maximum)	404 feet
Roller circle diameter	34 feet
Height of discharge point above coal	144 feet
Excavating range above coal (low)	40 feet
(high)	100 feet
DIGGING WHEEL	
Diameter	24 feet
Number of buckets	9
Bucket capacity	1½ cu. yds. (bank measurement)
Rpm (variable) normal	7
Swing speed at digging point	50–150 fpm
BELTS	
Ladder belt width	54 inches
Ladder belt speed	900 fpm
Ladder conveyor length	91 feet
Stacker belt width	54 inches
Stacker belt speed	1,000 fpm
Stacker conveyor length	326 feet
ELECTRIC POWER	
Motor-generators	2 @ 1,000 hp each
Wheel drive motor	250/500 hp
Ladder belt drive motor	187½/375 hp
Ladder crowd drive motor	100 hp
Stacker belt drive motors	2 @ 250/500 hp
Swing drive motors	2 @ 25/50 hp
Propel drive motors	4 @ 100 hp
WEIGHT	
Working weight without belts	3,200,000 lbs.

Continued from page 21

tric-powered Bucyrus-Erie 170-B shovel carrying a 10-yd. coal loading dipper. Working under the shovel are a fleet of eleven Euclid diesel trucks. They are model 29TDT bottom-dumps with a 50-ton capacity. The trucks make a round-trip haul of from three to eight miles from the pit to tipple and back.

The trailers have a struck capacity of 62 cubic yards and heaped capacity of 70 cubic yards.

The tractors are powered by Cummins NRTO-6 335-hp turbocharged diesel engines and are equipped with Fuller Road Ranger R-1150 nine-speed single-stick transmissions.

Pits are layed out to accommodate loop haulage as much as possible. Haul roads from the main road into the pit are limited to 6% grade if they are to be used by loaded trucks, and to 12% if used by empties.

The hauling roads are a minimum 60 feet wide, and the trucks can pass each other at any place on them. All of the roads, except those on the coal seam, have a fireclay base and a crushed rock surface. The pit roads are watered by a 2,000-gallon Euclid tank truck. Caterpillar No. 12 motor graders are in daily operation to keep the road surface in good condition.

Electric power is delivered from high lines to the main substation near the preparation plant at 33,000 volts. There a 5,000-KVA substation steps down the voltage to 2,300 for delivery to the preparation plant. It is further reduced by two 1,500-KVA substations to 480 volts at the plant.

To operate stripping equipment in the pit, power is transmitted three miles by pole line from the main substation to a 5,000-KVA substation. This unit reduces the voltage for powering the Marion 5760 70-yd. shovel, the wheel excavator and the 170-B electric shovel.

At the preparation plant, coal haulers bottom-dump their coal into a 1,500-ton concrete hopper. At the bottom of the hopper, a 66-in. reciprocating feeder delivers 1,400 tons per hour of raw coal to a 60-in. belt traveling 280 feet per minute.

This belt lifts the coal to the breaker building, where it passes over a bar screen with 5-in. openings. The over product discharges into a 12 by 27-ft. McNally-Pittsburg rotary breaker and is reduced to 5-in. maximum size.

The through products of the bar screen and breaker combine and drop onto a 48-in. belt conveyor for elevation to the top of the preparation plant.

Ultramodern Plant

Exterior of the preparation building is entirely sheathed in stainless steel, presenting a plant appearance that is unique in the industry. Inside the plant, coal moves along a swift conveyor belt to massive crushers and is fed into four wash boxes. The washing is a flotation process which cleans the fuel thoroughly. Coal is lighter than rock, slate and other impurities. These non-combustible materials sink to the bottom of the boxes and are expelled from the plant.

Pure coal next goes to precision-built vibrating screens which perfectly size the product for various types of burning equipment. Finally, the washed coal is conveyed to heat driers and then is loaded into railroad cars or sent to bins for storage. Washing capacity of the plant is 1,200 tons per hour.

The product moves to market in three ways—by truck to nearby users and by rail or river barges to more distant markets. Rail shipments are made via the Illinois Central Railroad direct or its connections at nearby East St. Louis, Ill. Two storage bins at the plant serve the truck trade.

Trans-shipment of coal from cars

to barges on the Mississippi River is handled at the River King loading dock, one of the largest on the inland waterway system. The dock, stretching nearly half a mile along the waterfront at East St. Louis, has a mooring capacity of 30 barges.

Clean coal is pulled to the river dock in 35-car trains by two 1,000-hp General Motors diesel units. Cars are stored at the dock on any one of four tracks.

From the rail cars coal is automatically unloaded into a 700-ton hopper and moves on a 48-in. wide conveyor belt a distance of 225 feet to the dock structure. The 1,200-ton barges wait to receive their cargo at 16 mammoth steel caissons. These caissons are sheet steel piling backfilled with crushed stone, and have a concrete diaphram at mid-section. They are capped with concrete. A switching boat maneuvers the barges into position. Coal is loaded into them at the rate of 1,500 tons per hour.

The River King mine has tremendous reserves, enough for a life of at least 50 years. Potential annual output is 4 million tons. Coal now is produced entirely by stripping, but the plant is centered over 100 million tons of coal that some day will be tapped by a slope shaft near the plant.

River King, in all phases of its operation, is far advanced over what were considered modern methods only a few years ago. The plant and pit equipment have taken a huge investment, but Peabody officials are confident it will pay off in the years ahead.

Coal has an economic advantage over other types of fuels. This is especially true in the Midwest where Peabody mines, transportation facilities and coal reserves are located. For example, coal generates more electricity than oil, gas and water power combined. In 1959, 168 million tons of coal were used to generate electricity. It is estimated this figure will climb to 475 million tons by 1975.

Chairman of the board of Peabody Coal Co. is F. Stillman Elfred, who recently finished a one-year term as chairman of the National Coal Association and is now on its executive committee. President of the coal firm is Merl C. Kelce.

Other officers include Ted L. Kelce, executive vice president, and R. F. Barrow, vice president and general sales manager. Cecil P. Arnold is vice president in charge of engineering. Cecil M. Guthrie and D. G. Johnston are vice presidents—stripping operations. H. C. McCollum is vice president—underground mining operations.

W. A. (Bill) Weimer is chief engineer of Illinois stripping projects at Peabody's St. Louis office.

River King Personnel

At the River King mine, the Peabody operating personnel is headed by James P. McDowell, general superintendent of Illinois stripping operations.

Herb Fox, Albert Casky and Harry Mesch are pit foremen. Doris Lanier is chief electrician and drilling and blasting foreman; Leroy Rohr and Bruce Finley, mechanical shop foremen; Leroy Sheaffer, truck foreman; and John Heatherly and Clyde Juenger, tipple foremen. Fred Chilton is superintendent at the new Athens (Ill.) mine, which is being operated from the nearby River King facilities.

While the excavating range of the Peabody wheel goes from 40 feet above the coal to 100 feet, it would be possible under certain circumstances to extend this range on other units of a similar type. The wheel excavator must be tailored specifically for the individual mining operation, since a great deal of design flexibility is possible.

The wheels built thus far in the United States have encountered a wide variety of digging conditions. (Besides the Peabody wheel, there are five others—all working in central and southern Illinois coal fields. Three are owned by the United Electric Coal Companies, and two by the Traux-Traer Coal Co.) At these mines, there are boulders, large frost chunks, shale and cap rock, and the clay comes as sticky as it is likely to be found anywhere.

In addition to coal field applications, the wheel can be designed to strip overburden from mineral deposits such as phosphate, bauxite, copper and iron ore, as well as other special applications.

River King mine's 1250-B walking dragline formerly was assigned as a pull-back machine on the spoil piles. It is shown here opening up a box cut to extend the coal pit.

Big idea?

The biggest. This is an artist's conception of the largest mobile land machine in the world... a mammoth stripping shovel now being built by Bucyrus-Erie for Peabody Coal Company, St. Louis, Missouri.

It will move a half-million pounds in every bite... 36 million cubic yards a year... uncover enough coal in a day to heat 7,500 average homes for one month.

Most important, it is expected to lower the cost of mining deeply buried coal which otherwise could not be recovered by strip mining methods.

Big idea?

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How the Wheel Excavator Works

We say that a shovel has a 10-yd. dipper or a dragline is a 20-yd. machine, but such designations have only limited meaning when applied to the wheel excavator. Element of time affects machine capacity.

THE wheel excavator gets its name from the use of a conical shaped digging wheel on which are mounted multiple buckets. The bucket-studded wheel revolves into the overburden face in an easy digging motion that produces a soft, burring sound.

When the buckets reach the top segment of the wheel circle, their dirt load falls onto a conveyor system that carries the material far out behind the machine. Falling off the end of the conveyor belt, the material spews on top of the spoil piles.

That, simply, is the mechanical principle of wheel excavator operation.

The River King mine's new Bucyrus-Erie 1054-WX machine has a digging wheel equipped with 9 chain-backed buckets. It measures 24 feet in diameter over the bucket lips. The buckets themselves are 45 inches wide. A heavy chain mat forms the back of each bucket to assure rapid dirt fall-out when the buckets reach discharge position. Just how much dirt these buckets can dig is only expressed by bringing in the element of time. We say that a shovel is a 10-yd. shovel or a dragline is a 20-yd. dragline, but such designations have only limited meaning when speaking of the wheel excavator.

Theoretically, the Bucyrus-Erie 1054-WX wheel excavator has a digging capacity of 13.5 cubic yards of dirt. The figure is obtained by multiplying the 9 buckets by the individual capacity, 1½ cubic yards. This is the static dirt holding capacity if each bucket obtained a full load.

In practice, the buckets actually pick up about one yard of loose material. The "cruising" speed of the wheel is 7 revolutions per minute, which breaks down to a rate of 63 buckets past the digging area in a minute.

As it fans back and forth across the face of the bank, the 24-ft. dia. wheel leaves an interesting concave pattern in clay.

The most important statistics about the earthmoving capacity of the wheel excavator, however, do not concern the wheel itself. They are concerned with the conveyor system. It is the speed of the conveyors times their capacity which determines the maxi-

Material dropping from the buckets tumbles onto an inclined slope sheet to break its fall before hitting the conveyor belt. Wheel rotates at 7 rpm.

mum performance possible with a wheel excavator. The dirt conveying system literally determines how much dirt the machine can move.

Two conveyors are incorporated in the 1054-WX wheel excavator. One is on the digging end of the machine, called the digging ladder. The other is the stacker conveyor, mounted on the stacking ladder. Both belts are 54 inches wide. The digging ladder belt is 10-ply; the stacker belt 7-ply. Both were made by Raybestos-Manhattan.

Belt speeds are high—so high they were believed impossible for this type of service a few years ago. Normal running speed for the digging ladder belt is 900 fpm and the normal speed for the stacker conveyor belt is 1,000 fpm. These are the standard operating speeds but they may be varied. Both belts are driven by DC motors under Ward Leonard control, which allows the speed to be adjusted to suit digging conditions.

The speed and capacity of these belts determine what "size" wheel excavator you have. Maximum capacity, at 100% efficiency, would be maximum speed under a fully loaded belt.

The wheel excavator moves on four sets of crawlers like those of a large stripping shovel. A specially insulated, fully enclosed AC motor drives each of the four crawler units.

A worker steers the excavator by hydraulically slewing the crawlers to right or left. The crawler steering units are connected so that the forward and rear sets may be slewed in the same or opposite directions. This action gives the same effect as four-wheel steering in a wagon.

Hydraulic jacks at the base's four corners keep the machine level. A mercury switch and piping design equalizes pressures in the jacks and makes the leveling process automatic and almost instantaneous. The design gives the machine great stability and reduces uneven wear on many parts.

The machine may be propelled in only two positions. When the conveyors are parallel with crawler travel direction or when they are at right angles to it, the wheel excavator may be put into propel. In any other position, limit switches will prevent propelling. The design also minimizes loads on the lower works.

Propel speed is 0.16 miles per hour. Move-ups usually take only a few minutes. Horns serve as "keep clear" signals during propel.

The revolving frame is a specially designed unit similar in size to the Bucyrus-Erie 1050-B stripping shovel. It is designed to support all the swinging parts and to withstand the loads from them. The way these loads act on the frame is peculiar to the wheel excavator and special design in the revolving frame is necessary. The frame unit is approximately 48 feet long, 30 feet wide and 50 inches deep.

The entire machine above the base can be swung through a complete circle. Swing circle diameter is 34 feet. Two swing units give the machine correct speed for digging. The swing mechanism produces a maximum 27,000 pound side digging force on the buckets. Normal swing speed is 1/6 to 1/10 rpm.

Arc Path

While it's digging, the business end of the machine fans back and forth across the face of the cut. The motion is similar to the way you would mow a lawn if you used an arc path and moved out a foot or two on each pass.

The business end of the wheel excavator noses into the dirt overburden. The digging wheel and machinery are mounted on an all-welded structural steel digging ladder. At its inner end, the ladder is equipped with trunnions on which saddle block and rack pinion are mounted. The saddle blocks are supported on the lower beams of a crowd machinery frame. On the upper beams of the crowd frame, 45 feet of gear tracks are mounted. Thus the digging ladder may be extended or retracted. It may

The 54-in. wide stacker ladder belt shown here speeds material at more than 1,000 fpm to the spoil pile. Belt is a special heavy-duty Raybestos-Manhattan design.

Wheel excavator puts unstable spoil far beyond the pit. Rock is dumped by the shovel in a buckwall at the base of piles.

be crowded in to keep the buckets in dirt. It may be moved a total length of 45 feet along the crowd frame which is inclined at a 15° slope. The crowd machinery frame forms part of the machine's superstructure. With a high wall slope of 4 feet vertical to 1 foot horizontal, the wheel excavator can dig a shelf in excess of 90 feet wide.

The digging ladder is 85 feet long, measured from centerline of trunnions to centerline of digging wheel. The spread from centerline to centerline of saddle blocks is 21 feet. The ladder structure is 15 feet 3 inches wide and 12 feet high at the highest point.

Sixteen feet aft of the digging wheel the digging ladder is supported by two 10-part tackle blocks. The suspension points were selected with two thoughts in mind. First, the locations are designed to relieve the rack gearing and the saddle blocks of as much load as possible. Second, the wide-spread twin suspension is calculated to resist the rolling or twisting forces imposed on the ladder by eccentric loads from the swinging forces acting on the wheel during digging.

The upper blocks of the digging ladder suspension tackle are mounted on an all-welded digging ladder gantry.

Hoist Machinery

The live ends of the suspension tackles lead over superstructure sheaves to twin drums. These drums are part of the digging ladder hoist machinery unit which is mounted on the revolving frame. One motor is geared to drive the twin drums. In order to adjust the two suspension tackles to equal length, and thus keep the digging ladder in correct plane, a disengaging coupling is provided. It allows each drum to be rotated independently of the other.

The hoist machinery raises or lowers the wheel within limits specified for the machine. The effective range is from 40 feet to 100 feet above the coal bed. In extreme low position, the digging ladder conveyor will follow a 15° incline. In the extreme high position, the downward decline of the conveyor is 15°. The crowd machinery unit, providing the crowding action to the ladder, is located at the top of the ladder at its inner end.

The wheel drive unit is mounted on deep, heavy girders properly designed to prevent excessive and damaging deflections to shafts, gears and bearings. Anti-friction roller bearings are used throughout this unit. The wheel itself is mounted on a non-rotating shaft whose diameter is 16½ inches under the bearings.

To absorb shock digging loads, a rubber cushioned clutch is installed on the wheel drive. To prevent dam-

Maximum distance the wheel excavator itself moves material (when the digging ladder is fully extended) is 404 feet. However, an additional 15 feet are gained through the trajectory of the falling material.

age from severe overloads, a Fawick air cushioned coupling is part of the drive machinery.

The machinery is powered to deliver a maximum digging force at the bucket lip of 63,000 pounds.

If the wheel discharged dirt from the buckets at an approximate 10-ft. height above the digging ladder belt in an unbroken fall, the continuous impact would soon wear out the belt. To ease the fall, a slope sheet is installed under the buckets. This inclined plate delivers the dirt to the belt with less force. Motor-powered scraper blades revolve across the slope sheet surface. Their purpose is to discourage dirt build-up.

Even with the slope sheet, the discharge to conveyor is pretty forceful and requires a specially designed conveyor for this severe service. Conveyor idlers, for example, in the loading zone consist of 12-in. diameter rubber discs mounted on 3 7/16-in. diameter shafts. Bearings are of the anti-friction, self-aligning roller type. They are mounted on 1 15/16-in. diameter shafts.

Another unique feature of the conveyor design is the positioning of the rollers. Only the inclined concentrating side rollers are in line. Center rollers are spaced staggered between the side rollers. This design was adopted to distribute the load more evenly and also to afford more uniform support for the conveyor belt. Spacing of impact idlers is 13 inches, leaving only a 1-in. space between center and side idlers where they lap over each other.

Outside the loading zone the idlers are of steel. Diameter is 7 inches and the anti-friction bearings are mounted on 1 7/16-in. diameter shafts.

The conveyor is so designed that multiple sections could be assembled and adjusted for proper levels and lead of the concentrating idlers in the manufacturer's shops. The field erection and training of the belt then become a simple matter. So successful was this procedure that the stacker conveyor which is 326 feet between terminal pulleys required no belt training at all.

A high pressure hydraulic pump

Advantages

AT many deep strip mines, the upper portion of the overburden frequently contains softer materials, such as gravel or free running sand, so that it has an inherently unstable nature. Where this is the case, stripping problems result.

In normal shovel operation (regardless of the size being used), there is a tendency for such material to slough off into the pit, necessitating frequent cleanup operations by the shovel to the detriment of its primary stripping efficiency.

Moreover, when this type material is cast into the spoil bank, all too frequently there is spoil bank sliding, resulting in either the loss of coal or the necessity

unit and cylinder maintains belt pressure automatically. A pressure governor controls the tension. A safety cut-out switch also keeps an automatic eye on the belt. If, for some reason, belt tension drops to a point where excessive belt slippage over the drive pulley takes place, the switch turns off the belt.

The digging ladder conveyor drive is mounted at the inner end of the ladder.

Stacker Ladder

The digging ladder conveyor delivers the material to the stacker conveyor. The first 151 feet of stacker conveyor are supported in the machine's superstructure. The outer 175 feet are mounted on a structural stacker ladder. At its inner end, the ladder is pin-connected to the superstructure. The ladder may be raised or lowered by a stacker ladder suspension tackle which supports the ladder at three points. Normal position for the stacker ladder is an incline of 15°.

The upper block of the suspension tackle is mounted at the head end of a structural stacker gantry. The top of the gantry is the machine's highest point. It is approximately 176 feet from that point to the coal bed.

Machinery for raising and lowering the stacker ladder is mounted on the revolving frame. The drive machinery for the conveyor itself is located on the superstructure just below the ladder's pin-connection point.

The stacker conveyor is similar in construction to the digging ladder conveyor. The 12-in. rubber impact carriers run the full length of the loading zone. Seven-inch steel idlers are employed for the remainder of the stacker. Spacing of the impact rollers is the same as for the digging ladder. Spacing of the steel rollers increases from 18 to 24 inches as the belt goes from inner end to outer end.

All major drive units of the machine are DC mill type motors and they are Ward Leonard controlled. Wheel drive motor is 250 hp @ 220V or 500 @ 440V. The digging ladder hoist motor is 150 hp @ 220V or 300 @ 440V. Digging ladder conveyor drive is 187½ hp @ 220V or 375 @ 440V. The stacker ladder conveyor drive is powered by two motors, each rated at 250 hp @ 220 V or 500 @ 440V.

Two 1,000-hp motor-driven generator sets furnish power to these motor units. One is mounted at each end of the revolving frame for better weight distribution.

The operating crew of the wheel excavator is the same as that of Peabody's large draglines or stripping shovels: an operator and an oiler. The operating controls of the wheel excavator are in the operator's cab, located in the superstructure approximately 81 feet above the ground. At this elevation, the operator enjoys an excellent panoramic view of the work area.

There are a number of design and operational advantages which the wheel excavator provides. These can prove extremely valuable to the strip mine owners.

Since the wheel is a continuous excavating machine as contrasted with an intermittent-digging machine like the shovel or dragline, it requires an even power input. There are no extreme peak loads as with the shovel and dragline. The load on structures and machinery units is even too, minus peak demands. This promotes long life and low maintenance.

There is no heavy, non-productive counterweight on the wheel excavator. Front-end and rear-end equipment balance each other, keeping weight low. And, of course, the digging and stacking swing directly opposite each other so the machine is always in balance.

of the Wheel Summed Up

of more cleanup work. In deeper overburden at or near the range limit of the stripping shovel, the pit width of necessity becomes narrower, and sliding trouble of this nature becomes more critical.

The operation of a wheel excavator, together with a shovel, relieves such problems. Here are some advantages of such a combination:

1. Overstripping of the softer unstable upper overburden by the wheel excavator develops a comparatively wide bench beyond the shovel high wall to eliminate most of the high wall sliding.

2. Spoil bank sliding tendencies are greatly reduced by the wheel excavator casting the softer, more unstable material on top of the harder shovel spoil, and placing it one cut or more back.

3. A shovel and wheel excavator combination results in a wider pit than attainable with either a shovel or large dragline working alone.

Faster Cycles

4. Use of a wheel excavator permits the shovel to work more efficiently against lower overburden depths. When the shovel must work close to its maximum reach and height, more care is necessary in spotting to dump, and usually greater swing angles are necessary, all resulting in longer cycle times and reduced shovel production rates.

5. Increased blast hole drilling efficiency can be expected when the wheel removes the easier upper overburden. The shelf created by the wheel permits drills to start vertical blast holes directly at the surface of the more difficult shovel spoil that requires shooting. Also this eliminates most of the problems of soft material at the top sloughing into holes already drilled.

6. Wheel excavator operation will facilitate restoration of the soil for agricultural use. The top soil and upper burden is cast by the wheel on top the spoil bank; also, the pattern in which the wheel spoil is deposited gives wider distribution with lower peaks and smaller ridges to be leveled off.

Quick Finish for Big Stack

by William F. Hallstead

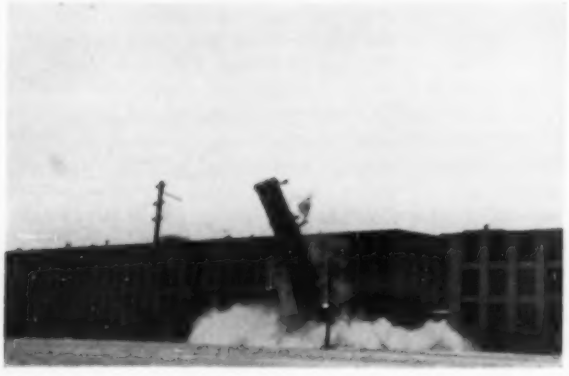
A SINGLE day's work was sufficient to demolish a 150-ft. tall brick stack at the Light Military Electronic plant of General Electric Co. Instrumental in this rapid and efficient operation was a Winkie diamond core drill.

"The Winkie drill," says Jack Loizeaux, president of Controlled Demolition, Inc., Baltimore, Md., "is so compact and easy to use that we were able to drill 32 holes in the chimney base in about 45 minutes. With an air drill, that would have taken us 3 to 4 hours."

Loizeaux, an explosives man with almost uncanny ability, has had wide experience in stack felling. He's cut them down in Virginia, Maryland, Pennsylvania and Washington, D.C. His chimney demolition, though highly dramatic, has safety as its basis.

Blasting expert Jack Loizeaux *(left)*, head of the demolition firm, and his assistant bite into the base of 150-ft. tall stack with small gasoline-powered Winkie drill. (Photo by *Utica Observer-Dispatch*)

***(Right)* An instant after firing, base is already well-fractured and major break has appeared ⅓ the way up stack.**



Halfway down, the stack is telescoping as it falls.

Top of stack strikes ground clear of pole line.

"Standard chimney razing with jackhammers means you must put a crew way up there to strip the stack course by course," he points out. "Taking the same stack down with dynamite keeps everybody's feet right on the ground."

The key to successful stack dynamiting is accuracy of fall. Loizeaux has dropped them with only 36 inches clearance during the early part of the downward swing, and he has laid one big chimney along the top of a retaining wall. The chimney in Utica required a deft touch to clear some wires. Its area of fall was an open parking lot.

Break Base

Loizeaux fired three separate 1-lb. loadings to open the chimney's base in the direction of desired fall. Then he loaded the final shot—18 pounds of 40% duPont Red Cross dynamite, specially manufactured in a 1 x 8-in. size.

The dynamite popped and the big stack swung down precisely as planned to crunch into a well-fractured windrow of rubble ready for loading. The speed of the Bucyrus-Erie Winkie drill plus the efficiency of dynamite made a few hours' work of a job that in the past usually took weeks of hazardous chipping.

Rubble is well broken, ready for loading. Area of fall is an open parking lot next to the GE plant.

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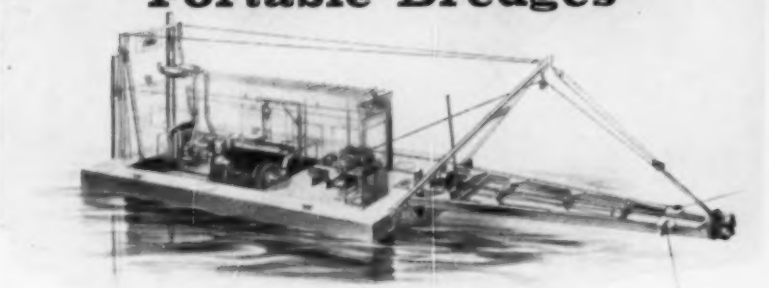

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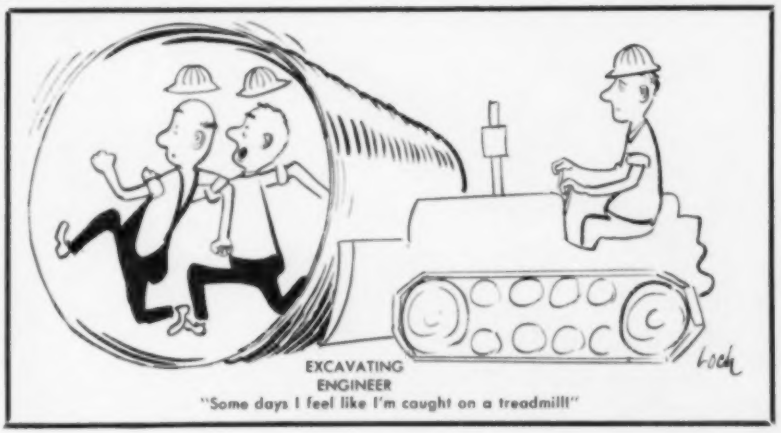

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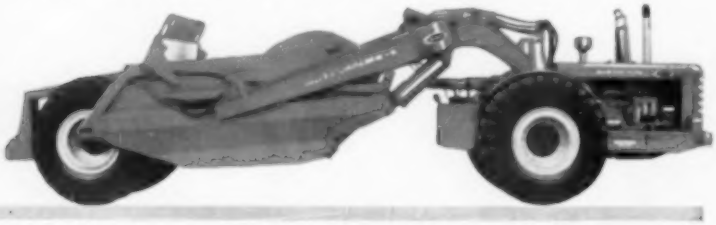

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...THAN OTHERS DO STRAIGHT AHEAD

This is the entrance to new Southwestern Cement plant at Odessa. Modern plant buildings appear in background.

Cement Plant Features Automation

by Ray Day

Southwestern Portland Cement Co. uses many new devices for moving and sampling raw materials as new Texas plant starts production.

TO even a casual visitor at the new cement plant that Southwestern Portland Cement Co. has built just west of Odessa, Tex., there are visible examples of automation. A 40-ton payload truck side dumps into an enormous hopper, but before the apron feeder can choke, something happens. It slows down. No human hand has touched a button. The feed is integrated to one of the world's largest primary crushers by automation.

Or take a careful look up in the operating room, just above where the trucks dump. A fully automatic weighing device weighs and records a running list of tonnage entering the plant. The discs, with their erratic ink etchings, become part of the plant's permanent record, bringing better control in cement manufacture by automation.

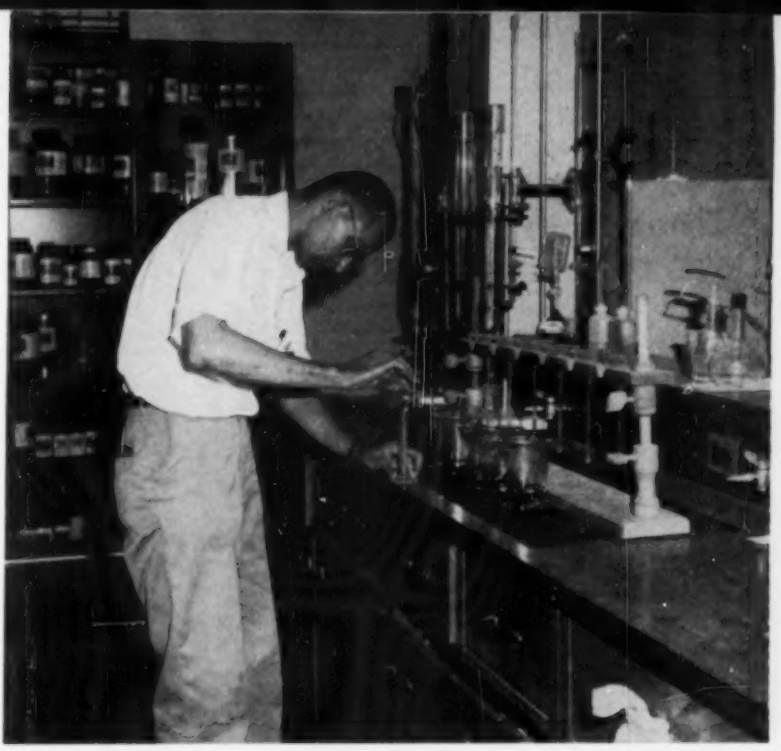
Take a walk down the quiet, clean corktile floor which leads to the chemical control lab. In it, you'll see the usual assortment of chemicals in bottles, test tubes, pipettes, flasks, presses, burners and the like. Chemists, however, aren't numerous. Part

This new shovel equipped with a 4-yd. dipper handles most of the raw-feed loading. Side dumper carries a 26-ton payload.

of the reason is an automatic X-ray spectrograph, recently purchased and now in use.

The machine takes a chunk of material for analysis, and in about five minutes can turn out a classification of any element heavier than magnesium.

The new plant went into production last May, joining other plants operated by Southwestern. The firm's first plant was built in El Paso, Tex., and the first cement was marketed in 1910. In 1916, the company's plant at Victorville, Calif., started production. Fairborn, Ohio, is the site of another Southwestern plant that started operation in 1925. Thus the company, whose headquarters are in Los Angeles, now has four plants producing portland cement for a widespread geographical market. At the present time, the Odessa plant is augmenting the El Paso installation in serving west Texas and New Mexico.



(Above) **Chemist makes a calibration determination in modern lab.** ***(Left)*** **Hauler side-dumps limestone into feed hopper. Material is automatically fed to hammermill.**

Designed for production of 1,250,000 barrels a year, the Odessa plant features the modern theme of simplified machinery systems, with detailed functional instrumentation and extensive quality controlled features. Another design intention was that of expansion. All processes from quarrying through loading, are physically laid out so that expansion can be carried out without interruption to existing production facilities. At the present time, a well organized and equipped quarry operation is moving about 2,100 tons of raw material daily into the plant.

The new plant covers a tract of land adequate as to area and raw materials to last for many years. Only two raw materials used in the manufacture of cement are missing at the plant site. Gypsum is produced locally within the area, and slag is shipped from El Paso. All other materials, including limestone, silica and clay, are produced at the plant site.

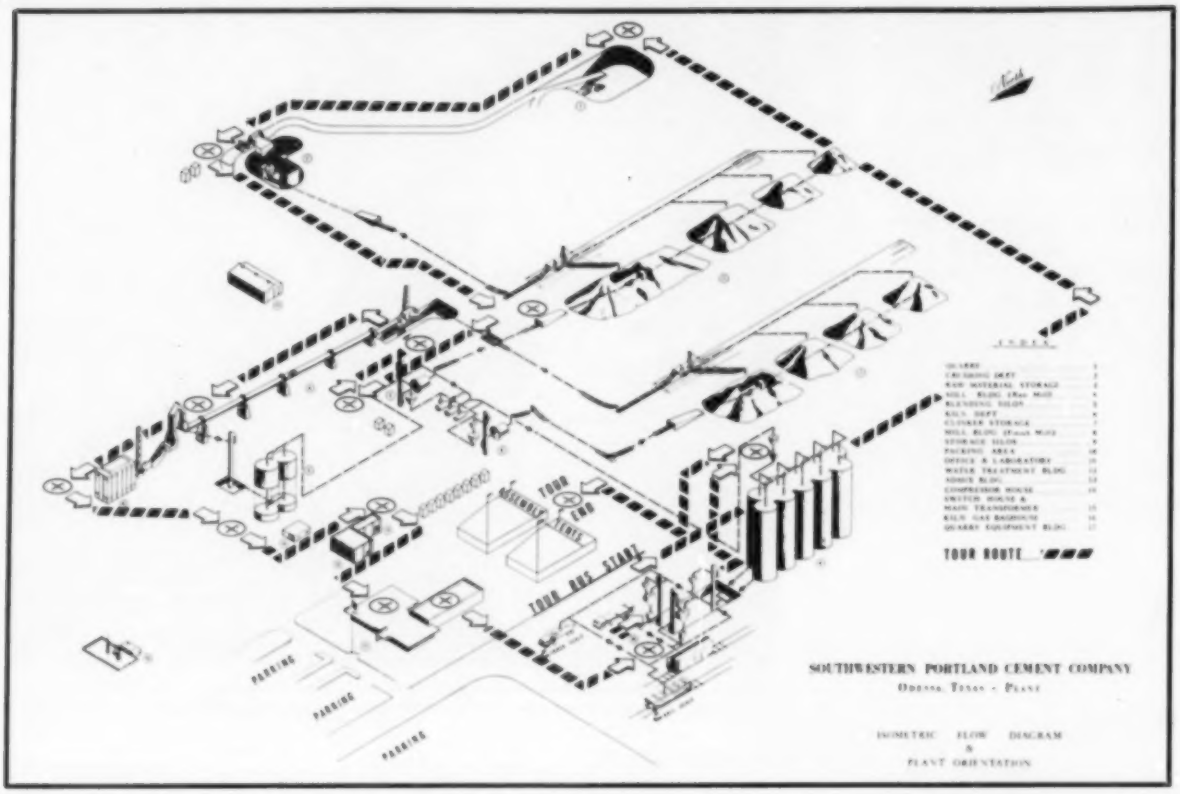
Limestone which occurs as calcium carbonate is the principal raw material being produced at the plant site. The excavating operation which produces this material is one of stripping, quarrying, drilling, blasting and loading.

The methods used in moving this raw material are fully in keeping with automatic features found elsewhere in the plant. The best possible system of mechanizing the excavation work within the framework of equipment investment has been adopted.

Overburden Depth Varies

The stripping overburden, which overlies the limestone rock, ranges in thickness from 3 feet at the present quarry, to a depth of about 18 feet in future parts of the development. The shallow lift now present consists of typical Texas caliche material—tough but rippable, and movable by a bulldozer. A large crawler tractor equipped with a heavy-duty ripper is being used for that purpose. The caliche overburden is simply ripped down to bedrock and the bulldozer

Quarry Supt. Jesse Gorman checks signals with his boss, Plant Mgr. George Siebert.



Guests are given this detailed layout on tours of the plant. Most of the material routing steps are handled automatically.

blade shoves the material aside. Part of the overburden is used in the manufacturing process.

It was decided to drill medium-diameter holes, because the limestone rock could be shattered better in that fashion. A modern electric rotary drill was brought in to handle the job. Using 4¼-in. diameter bits, this machine sinks drill holes down on a 6 x 10-ft. pattern. A row of holes is placed 6 feet back from the face and 10 feet apart and repeated as further holes are developed.

It isn't necessary to drill the holes too deep. Even in its ultimate development, the Odessa quarry will probably never be more than 40 feet deep. At the present time this is being drilled in two 20-ft. lifts chiefly because this is a practical way to separate high and low lime rock found in each of the two layers. Drill holes are being put down about 2½ feet below the quarry floor grade to get good toe breakage. And the limestone has not proved to be a particularly abrasive or tough material.

Some experimental shooting was done with gelatin-type explosives and bag powder. However, this was soon changed to the use of ammonium nitrate of an improved prilled type whose particles are not coated. The holes are being loaded by dumping the ammonium nitrate fertilizer from the bottom to a point about 6 feet from ground surface. About 2½ feet of stemming then is put in, and a special top charge of ammonium nitrate and gelatin-type high explosive is put in to break the hard caprock which overlies the basic limestone. Stemming then is put in to ground surface.

Holes are being fired by detonating fuse reaching down through both ammonium nitrate decks. When this material is used, no gelatin primers are necessary.

Good Breakage

It has been highly desirable to use delays, primarily for piling the shots and giving additional secondary breakage. This has been done by putting millisecond type connectors in the trunk lines just ahead of each hole, which delays the shots in the piling direction the quarry superin-

Powdermen load blast holes as shovels clean up previous blast material and complete secondary breakage.

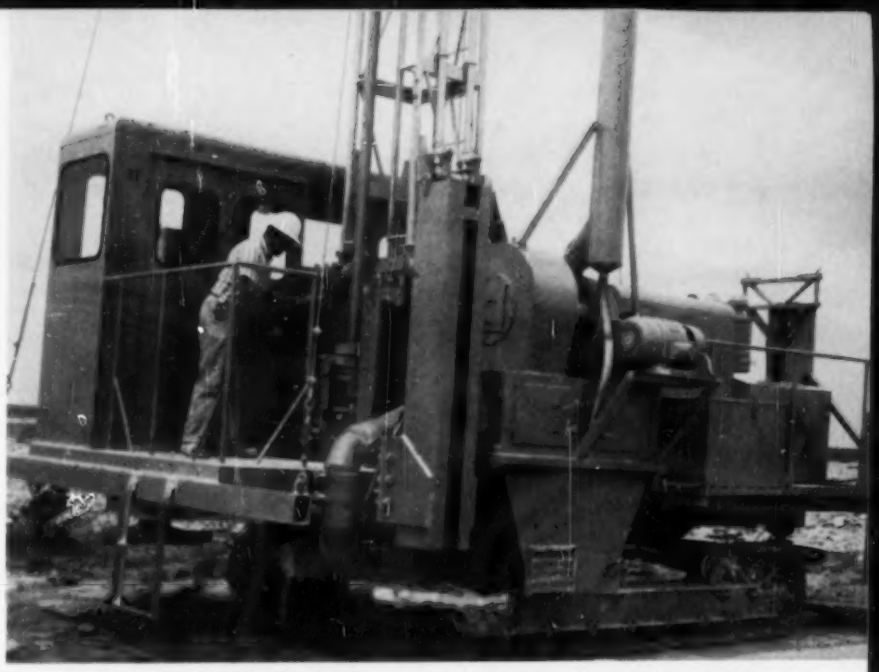
tendent wants. Some beautiful shots have been pulled, breaking the material down to particles not much bigger than about 24 inches. This has been done on a powder ratio of less than one pound per cubic yard. The only instances of incomplete breakage have been in caprock.

Because of this some secondary breakage has been necessary. It's been handled by a small crawler crane, using a 1,200-lb. breaking ball. This particular machine bears the distinction of having worked in all four of the company's quarries at some time or another. It was first used at the Ohio plant, then shipped to California, then used at El Paso for a few months, and finally sent on to Odessa.

For its shovel-loading operation, the company decided to buy a 4-yd. shovel. In addition, an older 3½-yd. machine was brought in for standby use on one of the quarry's lower levels. As a general rule, the older machine is used about 2½ hours every other day—the newer 4-yd. shovel excavates the remainder of the time.

Hauling units under these shovels are two side dumps which carry about 26 tons of pay capacity. They will take five swings from the shovel before the operator gives the move-away signal.

Primary reduction of the limestone rock is a rather spectacular operation, even for men long used to big equipment. Instead of using a jaw primary, or a gyratory crusher, this one was designed around the use of a huge 60-in. hammermill. There are fifteen, 460-lb. revolving hammers in this machine. A 600-hp motor rolls the hammermill at 600 rpm.



New electric drill sinks blast holes down on a 6x10-ft. pattern, 2½ feet deep.

Rock Feed Controlled

Material dumped from the trucks in the feed chamber slides down a heavy steel-reinforced throat to a Universal apron feeder. This feeder has a variable speed drive which matches raw feed to the capacity of the big hammermill close by. If the feed is sufficiently heavy to plug the hammermill, the apron feed slows down to reduce input to what the hammermill can take. Full provision also was made for eliminating the usual necessity of shutting down if oversize rock or bridged rock should plug the feeder. A 15-ton electric hoist, equipped with a special hook device, was installed on traveling

In five minutes, this new spectrograph can make an X-ray analysis of any material heavier than magnesium.

Southwestern's new powder magazine is one of the best built in the country.

cranes. It can go right down and dislodge bridged-over rock, even while the feeder is operating.

The automatic weighing and recording system also has been installed at this point to weigh all materials entering the plant. This helps to get more accurate count on raw materials entering the mill.

From the hammermill, rock is transported on conveyor belts to the raw materials storage area, and is transferred to an 85-ft. stacker that travels on its own track and stockpiles crushed rock in the proper location for future reclaiming. In this area are four principal piles—high rock, low rock, caliche and slag.

Rock is withdrawn from the crushed rock stockpiles through gravity feed hoppers located beneath the piles. Automatic feeders weigh the amount of each raw material delivered to the raw-grinding mill conveyor belt.

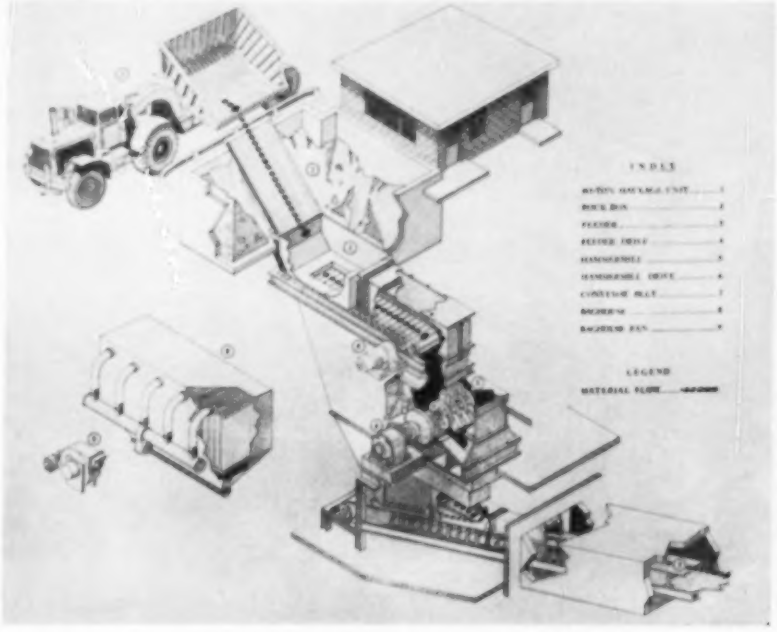
Material Pulverized

The raw material grinding mill is a horizontal steel cylinder 11½ feet in diameter and 17 feet long, which is rotated by a 1,250-hp motor. The mill is loaded almost half full of steel balls which serve as grinding media. As raw materials are fed into the revolving mill, these steel balls fall back on it and pulverize it into particles so small that 90% will pass a 200-mesh screen. Samples of the ground raw material are taken automatically and carefully analyzed in the laboratory. On the basis of these analyses, adjustments are made on the automatic feed control console to insure that correct portions of each essential ingredient are fed to the mill.

The pulverized raw material is then pumped to one of two blending silos, where it is kept under constant agitation by compressed air. The contents of these silos are again sampled and tested. If satisfactory, they are fed to the kiln. This is a monstrous shell, 400 feet long by 11½ feet in diameter, weighing 786,000 pounds. Over 10 carloads of refractory fire brick were used to line the kiln inside to protect the shell from the internal 2,700°F heat.

As the kiln revolves, 60 to 75 times per hour, the material moves by gravity down its ⅜ inch per foot slope toward the lower discharge end. Here, a flame of burning gas produces a temperature of about 2,750°F, and the raw material is chemically combined into particles called clinker. These semi-fused balls are the material from which cement is made. It

Isometric flow plan of crushing department shows move from hopper to hammermill. Automatic controls prevent plugging by oversize rock.



Rotary kiln burns cement slurry to clinker as it passes through 3700° heat.

takes almost 3½ million cubic feet of natural gas every 24 hours to operate the kiln.

The clinker is dropped into a cooler with large fans which force a great volume of air through reciprocating grates. Here, the white-hot clinker is quickly cooled and discharged on the belt which transports it to another 85-ft. stacker in the clinker storage area. As the clinker is conveyed to storage, continuous samples are taken for testing.

Large Finish Mill

The clinker is reclaimed through hoppers located in a tunnel beneath the piles and is sped to the finish grinding mill by conveyor belt regulated to constant weight. At this point, about 5% of gypsum (calcium sulfate) is added to regulate the setting time of the cement. Like the raw mill, the finish mill is 11½ feet in diameter and 17 feet long, and is driven by a 1,270-hp synchronous motor.

Fineness of the finished product is controlled by adjustments of the speed rate in the air separator. The air separator, located above the mill, separates coarse particles from the fines in a rapidly moving stream of air. Coarse particles are returned to the mill for further grinding, while fine material is pumped to cement storage silos. More than 90% of the cement will pass through a wire screen woven finer than silk cloth.

The ten reinforced-concrete silos are 121 feet high, and each contains about 10,000 barrels of cement when full. Cement is withdrawn from the storage silos, and is either packed into sacks, or loaded into trucks or railroad cars for shipment in bulk. Bulk shipments are weighed on large scales before leaving the loading area. The proximity of the plant to the Texas & Pacific Railroad, and to an excellent highway system, insures quick and efficient delivery to Southwestern's market.

The plant is now through its testing and shakedown period, and is moving steadily ahead to do the production job conceived by its designers.

One of the main problems in developing the plant was an adequate water supply. Water for plant use was pumped at first from wells on the property, extending 1,500 feet down into the Santa Rosa sands. Later several shallow wells were added. An expensive water-treatment process is necessary to remove all impurities.

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That's the Winkie diamond core drill—an invaluable tool for contractors, plumbers, concrete masons, utility maintenance men, miners, geologists, test borers, etc.

It weighs only 45 pounds . . . sets up in 5 minutes for grout-hole drilling, concrete coring, exploration, testing and probing, and many other specialized applications. It drills at any angle . . . fast, economically; requires less rechucking, less fuel; cuts cool clean cores . . . to 200 feet! AND you'll never burn a bit with a Winkie! 9W60

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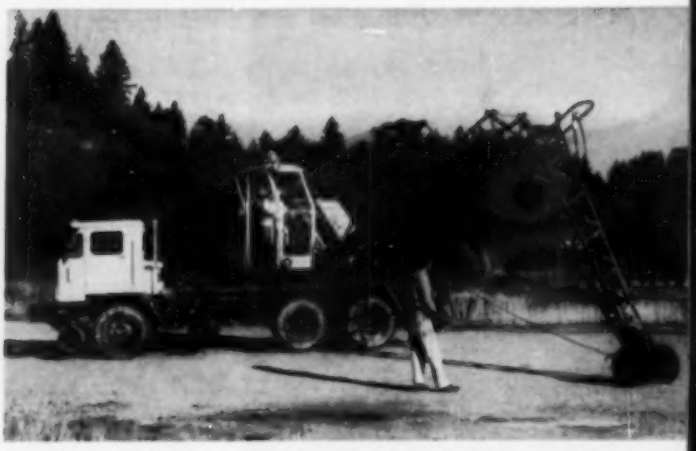


Here's a picture rundown showing how the 11-B Transitrailer goes to work. *(Left)* After a fast over-the-highway trip, it pulls in to a railroad crossing. *(Right)* Boom hinge is at work. Rubber tires at the boom point speed the erection.

Gandy Dancer's Limbo

Railroad maintenance gangs of yesterday are gone now.

Modern construction machinery is cheaper, faster and safer.

by Floyd Suter Bixby

EVER hear of a railroad work train getting off on a highway at the nearest crossing, running over to the nearest filling station, and gassing up on a credit card? Doesn't that pretty much shoot all your railroading concepts to pieces?

It's a reality, however, in the Tacoma division of Northern Pacific Railway Co. Thanks to the new development, major maintenance and betterment jobs are easy now. They're being done by regular section crews, instead of huge gangs of "gandy-dancers" prevalent a decade ago. Railroad maintenance has been modernized.

When the pictures for this article were made, three section gangs got together and relaid over 1,000 feet of the Olympia-Centralia branch line in a scheduled 2½-day period. In addition to track-laying jobs, the machine has been used for handling heavy bridge timbers, pouring concrete, and erecting retaining bulkheads along high fills. It's now in wide demand by the bridge and building department, and even the roadmaster's office has found uses for the new machine in making lifts.

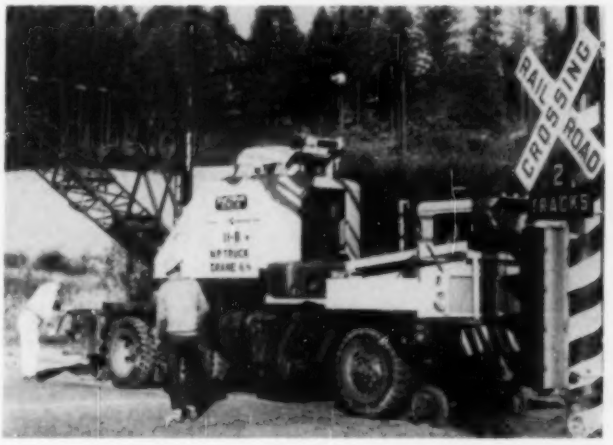
The new rig which Northern Pacific has recently purchased is one of the first such units ever used for that purpose. It's a Bucyrus-Erie 11-B Series Two Transitrailer, which is simply a railroad adaptation of the standard 11-B Transit Crane. The addition of steel railroad wheels permits the machine to travel over railroad tracks, using its rubber highway tires as a driving mechanism. The railroad gear, actuated by hydraulic jacks, can be retracted for over-the-highway travel. It has an effective highway speed of about 35 miles per hour, and a railroad speed of about 20 mph. The railroad speed of course can be stepped up on a main-line track where the rails are smoother.

The machine is mounted on a Crane Carrier Corp. carrier, and driving can be remotely controlled, if necessary, from the crane cab. Northern Pacific uses a truck driver to run the machine, and an operator to handle the crane section. The carrier is mounted on two sets of Goodrich 9:00x20 dual rears, and one set of 9:00x20 front tires. It can change over from highway travel to track operation at any convenient railroad crossing.

Extra Attachments

The machine was purchased with a hoe attachment, and with a crane boom and Kiesler clamshell bucket. These attachments are indicative of the type of work railroad company officials expect the machine to do. Up to now, the hoe attachment has been used chiefly because of the pressure of other jobs. During its first three months of operation, the machine was used in the Seattle area almost continuously on bridge maintenance. In that capacity, it handled 4-ton loads with a relatively flat boom, and showed remarkable precision in its controls.

(Left) **As hoist cables and load lines are rigged by oiler, the operator lubes boom point fittings.** *(Right)* **Now the rig moves into position over the railroad tracks. Operator begins to lower the railroad wheel assembly on the rails.**



Front and rear railroad wheels are down and the rig is ready for a day's work on the rail re-laying job.

The move to a machine of this kind has been dictated by growing economic pressures. Section-hand and extra-gang labor is just as expensive for railroad companies as it is for packing houses, fruitgrowers or farmers. Veteran railroad men have known for some time that the answer to better track maintenance lies in mechanization of many of the operations formerly done by hand. Men like Section Foreman C. W. Nottage, of Olympia, scratch their heads in amazement as they contemplate the changes that have come about in their lifetime.

Consider, for example, the job which Nottage and two other foremen recently did on the Olympia-Centralia branch line. Here it was necessary to pick up 1,000 feet of old 33-ft. 90-lb. rail, salvage the material, and replace it with 39-ft. 112-lb. steel. In railroad terminology, incidentally, the 90 and 112-lb. weights refer to pieces 3 feet long instead of the conventional one foot used by structural-steel engineers. The two sections lay on rather sharp curves, and the work was complicated by the usual railroad problem of having to move freight trains through at scheduled times. Yet, Nottage was able confidently to send trackmen out to pull the spikes from 300 feet of rail in mid-morning, knowing he'd be closed up and finished again by noon, when the local freight was scheduled.

It was a simple process. Using no more men than the regular two and three-man section crews, which are conventional today, three section foremen moved in with their regular crews. No additional help was hired. There weren't very many anti-creepers (or rail anchors) left on the rails, and this old hardware was pried off. Spikes were pulled by crowbar-type pullers, and a spot was opened up on the upper rail by cutting into it with a Racine power saw. It took less than two minutes for the power hacksaw to make a clean, neat cut through the old rail.

Lifts Rails

The round heads of joint bolts had rusted in badly, so it was necessary to burn more than half the joint bolts off with an Airco oxy-acetylene outfit. The joint plates were then removed, and the 11-B quickly moved in and cast the old rail aside. It was a simple matter then to drive wood plugs into the old spike holes, adze them off to a finish, and sweep the tieplate area clean. The new rail was then picked up by the 11-B, set into place, and accurately positioned. About half the spikes necessary to hold the rail then were driven, to carry the 11-B onto the next location where the process was repeated. After the 11-B passed up the track for several rails, the remaining spikes were driven. Also, to hold the ties in correct spacing, creepers were installed approximately every other tie on the new line.

Nottage has found in his practice that it's usually best to work the upper rail first around the curve, then do the lower. He followed this process here with good results since he was able to boost the work right along as scheduled.

Many of the other maintenance items which formerly were done by hand labor also have been mechanized. For instance, when the power hacksaw cut had been made, it was necessary to drill new bolt holes through the steel flange. It used to be

Working just ahead of the Transitrailer, one of the section crew members cuts loose rustbound joint bolts loose with oxy-acetylene outfit.

a back-breaking job. Plenty of cranking was necessary, as steel bits were turned by a ratchet handle. Today, it's handled in a matter of just a few minutes by a power machine. In track maintenance also, ties are tamped mechanically, and welding frequently is done by the automatic and semi-automatic process. Scarcely a job that remains calls for the type of back-breaking labor section work was around the turn of the century.

It's paid off, too, in a gradual reduction of section crews. Today, thanks to better mechanization, section crews are down from the six or seven men of 30 years ago to two or three men. And sections have been lengthened out in the meantime so that a man's work goes farther.

New Uses

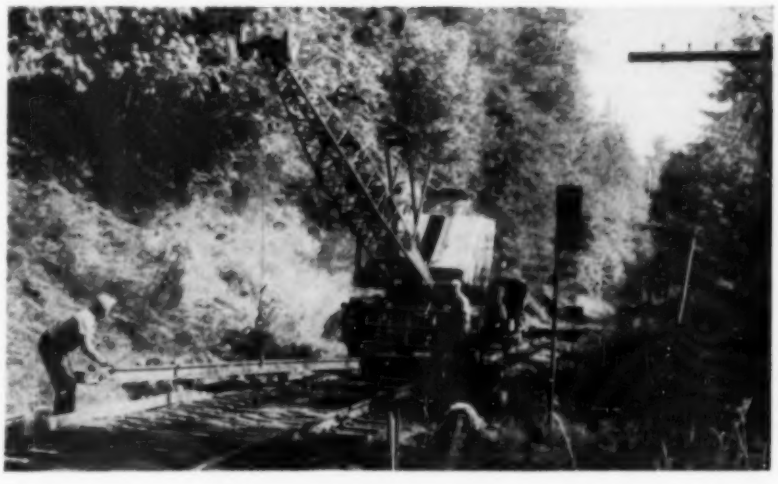
E. R. Anderson, division roadmaster for the Northern Pacific at Tacoma, expects that the new machine will find a constantly increasing number of maintenance jobs. No doubt there will be concrete to pour in the future, slides to remove, and fills to be built in where sloughed out areas occurred. The Tacoma division is one where heavy bridge timbers have been traditionally used, because timber is so plentiful. Replacement and handling of such timbers should be a natural job for the new machine, said Anderson.

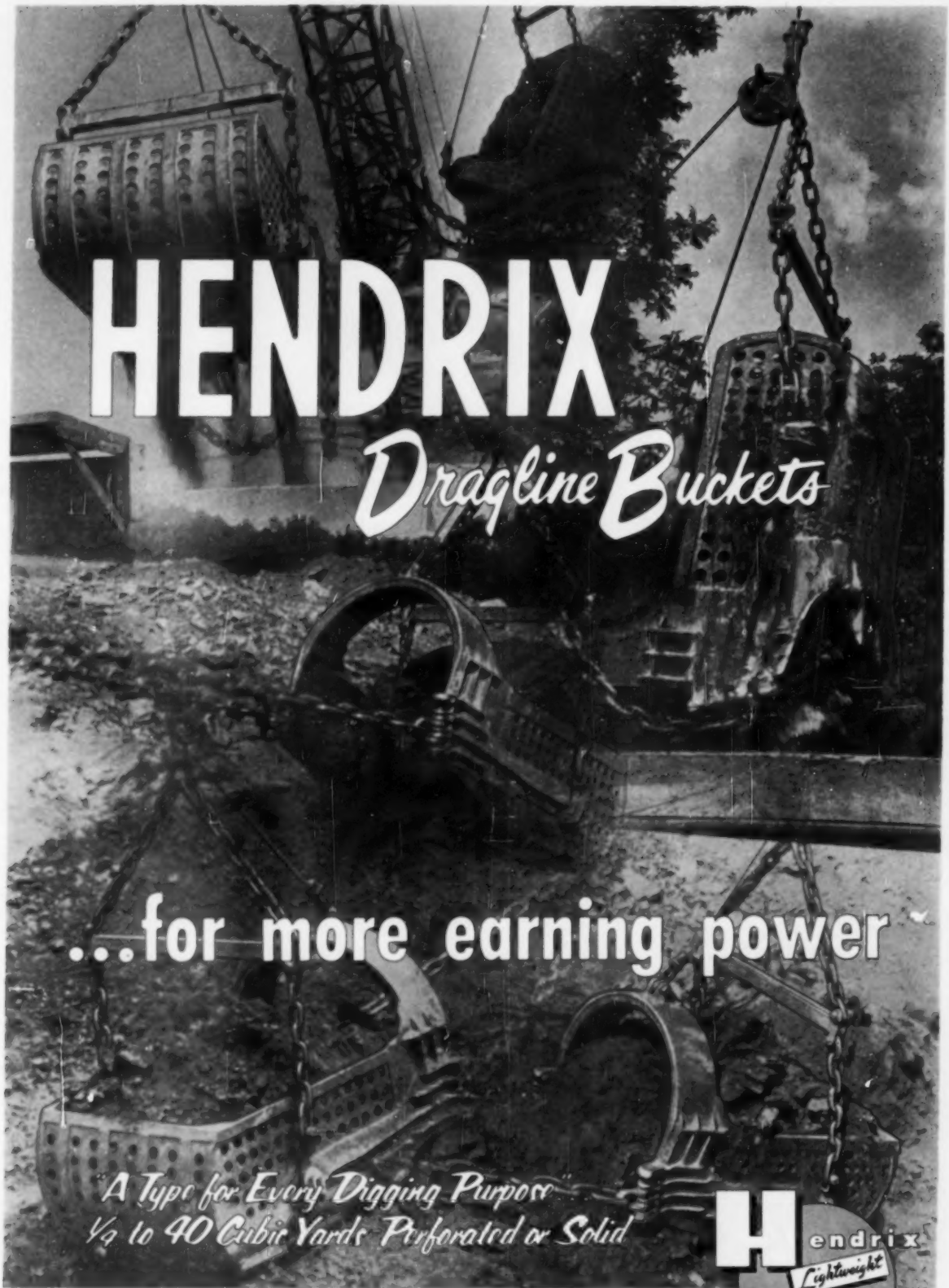
It isn't often, really, that the Transitrailer runs out of gas and has to use its credit card at a service station. Generally, says Operator Harry Baker, its fuel tank easily lasts an entire shift, even when the work is heavy. Service work on fueling, lubrication and the like can then be done at the section toolhouse in the yard, after the main day's work is over.

As the new machine gets around over the Tacoma network of Northern Pacific's lines, more and more people have been startled to see a conventional rubber-tire truck crane running around the highways with railroad wheels fore and aft, or to see the same machine moving down the railroad track under its own power. Like all new innovations, though, this one has a job to do—that of replacing the huge labor gangs of long ago. And from all indications, it's doing exactly that to the general betterment of railroad maintenance at large.

(Right) Sawing into a rail used to be a tough hand-labor job. Today, a Racine power saw makes the cut a matter of only a few minutes.

(Below) The 11-B tosses old rail aside; moves new one into position with boom low down.





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TIMED TO PROVE FASTER HAULING

On the job described here, a 15-ton Koehring 100 Dumptor was matched against another leading rear-dump hauling unit. The Dumptor out hauled its competition by an amazing margin — actual time studies (see table) showed the Dumptor making almost twice as many round trips! Why the big difference? One reason was that the competitive hauler had to back down the grade — as one observer said, "You could smell the brakes burning".

Check out the 100 Dumptor in your own operation. Here's a 30,000 lb. payload machine with a big 10' x 10'-9" body. Instantaneous or controlled dumping. No turn operation. Full speed in both directions. Hydraulic clutches for direction and speed range selection combine with torque converter drive and power-steering for maximum operating ease and speed. Your Koehring distributor has all the facts. Call him for a demonstration.

HAUL UNIT	HAUL TIME			DUMP TIME			RETURN TIME			AVERAGE TRIP
TYPICAL TRIPS	#1	#2	#3	#1	#2	#3	#1	#2	#3	
15 TON DUMPTOR	:48	:53	:49	:07	:06	:04	:37	:43	:48	1 min. 38 sec.
18 TON REAR DUMP HAULER	1:25	2:00	1:53	:14	:16	:17	1:12	1:09	1:14	3 min. 13 sec.

Test of Dumptor vs. rear dump hauling unit on job covering 603 feet total one-way haul with 204 feet of total distance on a 20% grade.

KOEHRING
DIVISION OF KOEHRING COMPANY
Milwaukee 16, Wisconsin

MODEL 100
15 TON DUMPTOR

SKOOPER WINS BLUE RIBBON MINING AWARD

A Mining World Blue Ribbon Equipment Award went to the Koehring Skooper in 1960. Selections were made for the most outstanding equipment contributions to the advancement of minerals industries technology.

...no flying starts

...no spinning tires

...no churning crawlers

SKOOPER SITS TIGHT— KEEPS RIGHT ON LOADING!

No need to run a machine into the ground for big production loading and digging. Skooper delivers big loading tonnages from a standstill, using less horsepower, with less maintenance.

7′ HYDRAULIC CROWD — provides tremendous breakout, heaped loads on every bite without moving the tracks.

360° SWING — no waste drive-in, back-off motion. Skooper swings its 2-yard load around to the truck. Can lift bucket to 12′-10″ height for dumping.

ONLY 64 HP — Skooper horsepower is used for digging, not for jockeying the machine around. Delivers more tonnage with less fuel.

LESS MAINTENANCE — standstill digging and loading means lower maintenance requirements. No tired tires to contend with, either.

Check the Skooper yourself — check its fast cycle time, and unique excavator-crane convertibility. See your Koehring distributor soon.

K62

KOEHRING
DIVISION OF KOEHRING COMPANY
Milwaukee 16, Wisconsin

NEWS FROM THE FIELD

New York, Texas Men Are Honored by Moles Awards

Harry T. Immerman of Larchmont, N. Y., and Herman Brown of Houston, Tex., were named as the 1961 recipients of the awards given annually by the Moles for "outstanding achievement in construction."

The announcement was made Nov. 2 at a dinner meeting of the group, an association of leading figures in the tunneling, dam-building and heavy construction industry, at New York's Biltmore hotel. Formal presentation of the honors will be at the annual Moles' Awards dinner at the Waldorf Astoria hotel January 25.

H. T. Immerman

H. Brown

Immerman and Brown make up the 21st pair of honorees in a series that started in 1941 and numbers among its winners former President Herbert Hoover, Robert Moses, Adm. Ben Moreell, Peter Kiewit, Harvey Slocum and Lou Perini.

The award is considered the highest recognition that can be accorded for service to the American construction industry. It is made annually to one member of the society and to one non-member. Immerman is the member winner.

Immerman, a native of New York City, is vice president and chief engineer of Spencer, White & Prentis, Inc. He has been with the company since 1923. He designed and supervised installation of the first all-steel subway decking system in New York's Times Square.

Brown, a native of Belton, Tex., is president of Brown & Root, Inc., a Houston enterprise that has grown out of a company he founded in 1914 shortly after his graduation from the University of Texas. The company has been responsible for a total of more than $2,150,000,000 worth of construction projects throughout the world. Brown has organized associate companies in the fields of engineering, marine operations, securities, railway equipment, and gravel so that the parent company can have, as he describes it, "unified responsibility for engineering, design and construction."

Illinois Highway Gets Largest Pipe-Arch Culvert

A king-sized steel culvert now being erected near Peoria, Ill., for use as an automobile underpass will speed up construction of interstate highway 74 and save the taxpayers' money at the same time.

U. S. Steel's American Bridge division is installing side by side what are thought to be the two largest pipe-arch structures ever fabricated. Upon completion, they will form a two-lane underpass through the new interstate route between Peoria and Morton, Ill.

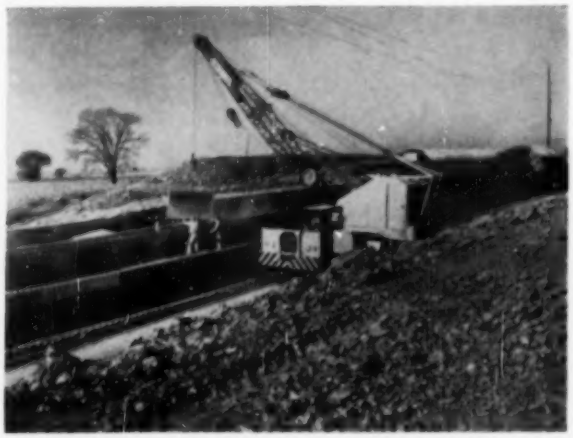
Each unit of the twin structures will be 334 feet long. Slightly egg-shaped, the completed tunnels will be approximately 20 feet wide and 17 feet high.

Requiring far less time to erect than a conventional bridge-type underpass, the corrugated steel units were shipped to the job prefabricated. A ten-man crew under construction superintendent Walt Falkenberg, was expected to complete the job in three to four weeks. Engineers estimate that building a conventional underpass would require three months or more.

Some 247 tons of five-gauge copper-bearing galvanized steel plates used in the sections were rolled at U. S. Steel's Homestead Works near Pittsburgh.

The plates, most of which measure approximately five feet by eight feet, were formed to specified shape at the fabricating plant. Units are bolted to-

Continued on page 50

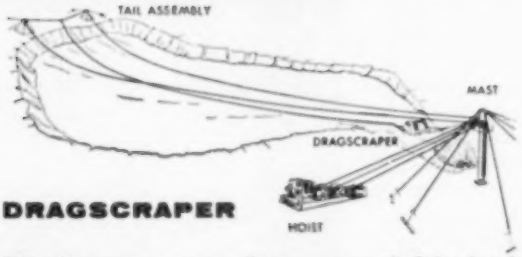


Looking like giant sea-shells, these corrugated steel plate structures will carry traffic under interstate 74 near Morton, Ill.

Cut Materials Handling Costs in Half . . . Dig *and Haul* with a Sauerman Machine

Operating costs as low as 6¢ per ton are reported by Sauerman DragScraper and Slackline Cableway owners. This cost includes labor, power and maintenance when digging free-caving material on average haul distances.

When you use a Sauerman DragScraper or Slackline Cableway, one machine does *both* digging and hauling from deposit to plant. No double handling is required. You cut labor and equipment costs in half—or even more—because a single Sauerman Machine, controlled by one man, replaces the multiple equipment needed for other methods.



DRAGSCRAPER

DragScrapers are usually recommended for bank or pit deposits. They dig from hillsides or underwater as easily as on level ground and can haul directly to hopper or field conveyor. The Sauerman DragScraper hoist is designed for continuous duty and many years of service. The operator's control station may be remotely located for maximum visibility of deposit and plant.

DragScrapers are built in sizes from 1/3 to 15 yds. to satisfy practically all tonnage requirements.

SLACKLINE CABLEWAY

When deep digging is required or anticipated in the future, a Sauerman Slackline is usually best for the job. This powerful excavator can dig 100 ft. below water, lift its load and deliver the material to a stockpile on a 1000-ft. span.

The Slackliner Bucket inhauls at high speed and dumps automatically. Dumping point is determined by a stop button on the track cable. Gravity returns the bucket to the digging point, completing the fast operating cycle.

The use of a stockpile permits a single 2-yd. Slackline Cableway to handle the material requirements of a 200-tph. plant. Slacklines are built in sizes up to 3½ cu. yds.

★

Find out how you can save with a Sauerman Machine. Write or call, giving tonnage requirements and a description of your deposit. Sauerman engineers will supply their recommendations on the most economical machine for you.

SAUERMAN BROS., INC. 622 SOUTH 28TH AVENUE • BELLWOOD, ILLINOIS
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CRESCENT DRAGSCRAPERS • SLACKLINE AND TAUTLINE CABLEWAYS • DUROLITE BLOCKS

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OPEN CHAIN LUBRICANT INCREASES CHAIN LIFE UP TO 300%

Penetrates, lubricates, prevents rust. Lubricates deep into chain linkage to reduce friction on pins, rollers, bushings, pressure surfaces. Corrosion inhibitor prevents rust in vital working mechanisms. Lubricates close-tolerance internal surfaces to increase chain life up to 300%. Highly recommended for all climatic conditions to stop rust and corrosion even in salt atmospheres.

Packaged in handy 16 oz. aerosol spray-on containers or in bulk — send for a free trial sample.

ANTI-FRICTION COMPOSITIONS HAVE NO MELTING OR DROPPING POINT

Packaged in 14½ oz. cartridges for handy application with lever-type cartridge guns for constant protection to roller, ball, sleeve bearings and sliding surfaces in "hot" bearing applications or in areas with high ambient heat. Exclusive formulas have no melting or dropping point; moisture resistant; will not wash out; exceptional metal adherence properties; temperature reducing qualities; high extreme pressure values. Available in two grades. Whitmore's Anti-Friction Composition No. 1 (light density), recommended for high speed, high temperature applications. Anti-Friction Composition No. 2 (heavy density), for low-speed high-temperature applications or loosely-fitted bearings. Specify No. when requesting free trial sample.

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News . . .

Continued from page 48

gether in the field to constitute a pipe which appears to have been flattened on the bottom. Some 36,000 high strength galvanized bolts secure the sections.

The underpass is being erected by American Bridge for Capital Supply Co., Springfield, Ill., sub-contractors for S. J. Groves & Sons, Springfield, general contractor for that portion of interstate 74.

Since the structure is the largest of its kind ever erected, Walt Falkenberg and his crew developed a special sequence of operations designed to learn the most economical construction methods. Individual steel plates are bolted together to form large sections weighing as much as five tons. The sections then are moved into position at the site—all of the bottom sections first then the top sections—completing the pipe-arch.

Completed tunnels will feature 14-ft. concrete roadways and pedestrian walkways—each tunnel carrying traffic in one direction.

Bituminous Coal Output To Rise in 1961

Production of U.S. bituminous coal in 1960 will reach 420 million tons, and increase to 423 million tons in 1961, according to estimates of the National Coal Association, Washington, D. C.

U. S. bituminous coal production last year was 412 million tons.

The NCA market forecast committee said the steadily-expanding electric utility industry—coal's biggest customer—would consume 175 million tons of coal in 1960 and 185 million tons in 1961. Coking coal, principally for the steel industry, is expected to account for 84 million tons this year and 83 million in 1961.

Other industries are expected to use 90 million tons of coal in 1960 and 88 million in 1961, the committee said. Retail deliveries of coal were forecast at 33 million tons this year and 31 million for 1961.

Shipments of U. S. coal to Canada were expected to be 12 million tons in each of the two years, while overseas exports were forecast at 26 million tons for 1960 and 24 million for 1961.

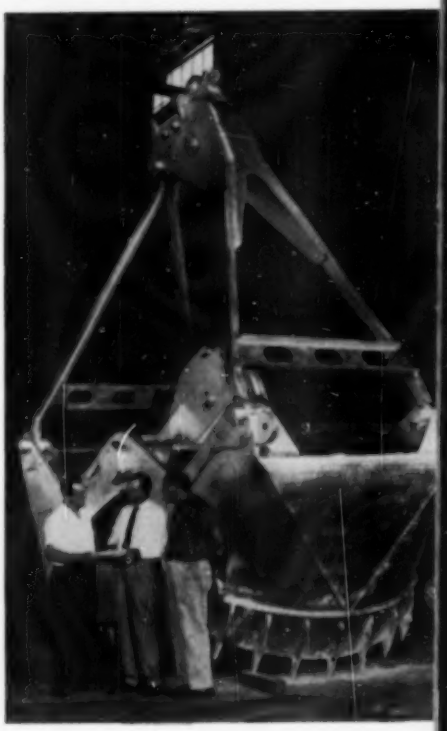
The forecast committee based its prediction on economic conditions continuing at about the present level through 1961. Coal is so closely linked to industrial production that booms and recessions have considerable effect on coal consumption. However, the largest coal customer, the utilities, are considerably more immune to cyclical swings.

South's Biggest Clam Bucket

Fabrication of the largest clamshell bucket ever produced in the South has been completed by Yaun Mfg. Co., Baton Rouge, La.

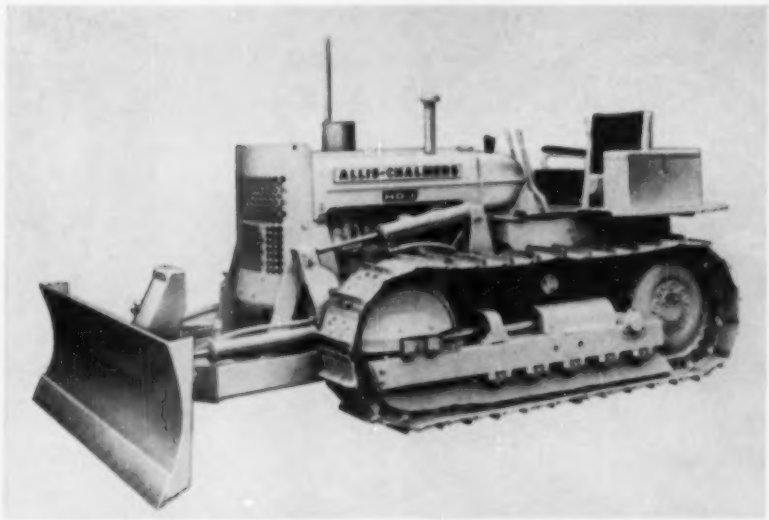
It was built for Mall, Inc., an offshore marine construction company, which presently operates three dredges in southern and southwestern Louisiana.

The big bucket, weighing some 24,000 pounds, is a 15-yd. round-nose type which can handle 18 heaped yards of material. It will be used on a 183-M Marion mounted on a barge soon to be placed into service by Mall.



BIG, BIG BUCKET—The largest clamshell bucket ever fabricated in the South dwarfs its builder, Cliff Yaun *(left)*, president of Yaun Mfg. Co., Inc., Baton Rouge; its new owner, A. A. (Tex) Lindley president of Mall, Inc.; and its designer, C. L. Paxton. It weighs 24,000 pounds and has an 18-yd. load capacity.

EQUIPMENT YOU OUGHT TO KNOW ABOUT



Small Crawler Tractor

Manufacturer: Allis-Chalmers Mfg. Co., Department EE, Milwaukee 1, Wis.

Claims: Allis-Chalmers has expanded its crawler tractor line to include a new compact unit—the H-3 powered by a 43-hp (manufacturer's rating) gasoline and the HD-3 with a 40-hp diesel engine. Both tractors are in the three-ton weight classification and enable Allis-Chalmers to offer a line of crawler tractors providing net engine horsepower ratings from 40 to 225 hp.

The H-3 is powered by the Allis-Chalmers Power-Crater 4-cylinder 149-cu. in. piston displacement gasoline engine which has a 3½ x 3⅞ bore and stroke, 7.5 to 1 compression ratio, and is rated at 1,650 rpm. The diesel engine of the HD-3 crawler is also four cylinders, but has a 3-9/16 x 4⅜ bore and stroke, and a 15.35 to 1 compression ratio. It also is rated at 1,650 rpm.

Fast, smooth direction reversing is accomplished with a Shuttle clutch that eliminates foot clutching or gear shifting. The Shuttle clutch lever has three positions—forward, neutral and rearward, and provides smooth, intermediate precision control between forward and rearward. The transmission has four gears providing speed ranges from 1.3 mph in first gear to 4.8 mph in fourth gear. Speeds are equal in both forward and reverse in any given gear.

Steering of this compact crawler tractor is similar to that of the larger Allis-Chalmers crawlers.

Track assemblies consist of four track rollers, 63¾ in. track length and 34 track shoes. Assemblies with five track rollers are optional.

Over-all length of the new crawlers is $108\frac{11}{16}$ inches, width is 62 inches, and height, to grille, is $48\frac{5}{16}$ inches.

Matched equipment is available to tailor the crawlers to a wide range of uses. There is a ⅞-yd. heavy-duty loader; a quick-attaching backhoe capable of trenching to 13 feet deep, three or five-tooth hydraulically operated scarifiers; rear-mounted hydraloader, logging arch and cable winch.

Three angle dozers are available for the H-3 and HD-3 crawler tractors. One is completely hydraulically controlled and features box steel push beams mounted inside the tracks; the other, of similar construction and mounting, is mechanically angled and tilted. Both blades are 80-in. wide and feature a 38-in. lift. A third model, also mechanically angled and tilted, has outside push beams and a 90-in. wide blade, and has a 4-ft. clearance when raised. All dozer blades are 24 inches high. Twenty-five pull-type, rear and front-mounted farm implements are also available.

The new compact crawler will be sold to the construction and other industrial markets by Allis-Chalmers construction machinery and utility tractor dealers, and to the farm market by farm equipment dealers.

Seven-Strand Rope

Manufacturer: Macwhyte Wire Rope Co., Department EE, Kenosha, Wis.

Claims: Macwhyte has introduced a completely new all-purpose wire rope. This rope will be marketed under the registered trade name of "7-FLEX."

The basic difference between this and ropes previously manufactured is that it is made of seven strands instead of the conventional six strands or eight strands generally used throughout industry.

The new 7-FLEX wire rope com-

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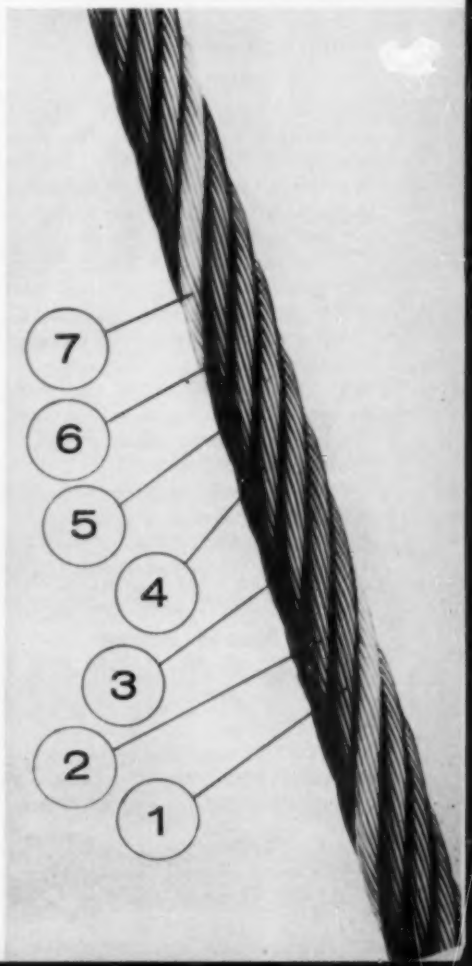


FOR 50 YEARS...
Finest in the Field!
Rely on the bucket contractors rely on. The Omaha Dragline Bucket gives full load with every cast. Perfect balance makes it easy to spot dump. Alloy steel cutting teeth stay sharp, tough and ready. Strike pay dirt now! Complete information and specifications await your letter.
DRAKE-WILLIAMS MOUNT • OMAHA, NEBR.
OMAHA
DRAGLINE BUCKETS

New Equipment . . .

Continued from page 51

bines the best features of six and eight strand types. It has an independent wire rope core. The rope has been tested and proved in service to meet the needs of modern high output machines for a wire rope having the best combination of wearing qualities (abrasion resistance) and flexibility (bending fatigue resistance).

Wire rope tires out from bending fatigue and wears out from abrasion. With the extra flexibility and more compactness of the seven strands, plus 16⅔% more wearing surface than six strand rope, 7-FLEX, as shown by exhaustive trials, has given surprising service.

Sizes manufactured at present are ½ to 1⅛-in. inclusive; new sizes will be added as needs arise.

Fuse Enclosures

Manufacturer: Austin Powder Co., Department EE, 458 Rockefeller Bldg., Cleveland 13, Ohio.

Claims: A new protective enclosure for preserving the effectiveness of detonating fuse by preventing water absorption in wet blast holes is announced by Austin Powder.

Known as Austin plastic fuse enclosure, it is recommended for sealing all fuse ends in the bottom or top of wet holes. Its use is particularly important in bottom charges where water problems may affect final results.

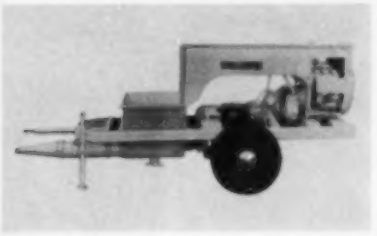
Watertight application is said to consist simply of pushing the enclosure over the fuse end. Enclosures are supplied 200 to a bag.

Grout Pump

Manufacturer: Challenge-Cook Bros., Inc., Department EE, 3334 San Fernando Rd., Los Angeles, Calif.

Claims: A new grout pump has been added to the Challenge line. The "Grout King" is a heavy-duty machine which will pump up to 20 cubic yards of material per hour. It will hoist material more than 10 stories high and pump it over 300 feet horizontally.

The pump is powered with a 30-hp air cooled engine equipped with an electric self-starter as standard equip-

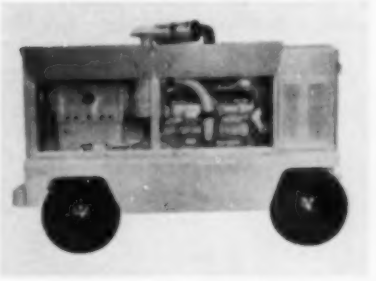


ment. It has a three-speed transmission with one reverse gear to assist in clean-out work. The Grout King is trailer mounted and easily towed from job to job.

Rotary Compressor

Manufacturer: Davey Compressor Co., Department EE, Kent, Ohio.

Claims: A new Cummins diesel-powered 600-cfm rotary compressor is announced by Davey Compressor Co. Known as model 600 RP, the unit is available in both skid and 4-wheel trailer mountings. Engine is the Cummins model HRS-6-B1, which is a 763-cu. in. size.



Dimensions of the 4-wheel trailer, as illustrated, are length, 141 inches; width, 79 inches; height, 92 inches. Weight is 8,800 pounds. The compressor, equipped with Davey "Perma-Vane" blades, is said to have 50% fewer operating parts than most other rotary machines.

Explosive Primers

Manufacturer: Austin Powder Co., Department EE, Cleveland 13, Ohio.

Claims: Three compact, easy-to-handle primers for safe, economical initiation of low grade ammonium nitrates and other blasting agents have been developed by Austin Powder.

Designated by color and known as

Continued on page 54

The new No. 12 Series E Motor Grader spreads untreated base and handles cleanup for Massey Sand and Rock Company

THE NEW NO. 12E SETS THE STANDARDS

Widening U. S. 60-77-99 to a 4-lane limited-access highway, Massey Sand and Rock Company of Indio, California, recently added a new No. 12E Motor Grader to its Cat fleet. The improvements, effective with this new series machine, showed up immediately. As Tom W. Carter, manager of the firm, puts it: "The increased productivity of the new No. 12 was very noticeable. You can depend on new Cat products to give greater operator comfort and better productivity."

One of the big reasons for the new performance standards of the No. 12 is the new compact 115 HP engine. Incorporating the latest developments in metallurgy and design, this modern engine has greater lugging ability for the tough jobs, long life and easier servicing.

Caterpillar engineers did not stop with just a compact diesel. There's a new vertical starting engine to give easier, all-weather starting. The dry-type air cleaner is now standard—it removes 99.8 per cent of air-borne dirt every service hour, cuts maintenance.

Of course, the new No. 12 retains the dependable Caterpillar oil clutch that gives up to 2000 hours without adjustment; mechanical controls that engage easily; and plenty of throat clearance between moldboard and circle for improved rolling action.

See your Caterpillar Dealer. He'll show you—on your job—that the No. 12E lives up to what users are saying about it. He can also show you the 150 HP No. 14, the No. 112F with 100 HP and the No. 112E with 85 HP—they're built to be the best for the job.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

THE NEW NO. 12 MOTOR GRADER BUILT FOR THE TOUGH JOBS

LOW COST DE-WATERING with FLYGT ELECTRIC PUMPS

On a recent $23,100,000 Sewer Job in California, 8 separate contractors licked severe ground water intrusion on a pipeline excavation 19 miles long with more than 40 Flygt Electric, Submersible Pumps. The Flygt pre-dewatering systems drained and kept dry ditches along the right-of-way at low cost in comparison with other dewatering methods. Typical of contractor comments on the system is this statement by the J. S. Barrett Co., who placed 5½ miles of 78" line:

"You just drop Flygt Pumps in the hole, turn them on and make only routine inspections. They keep the ditch dry at realistic cost with none of the trouble normally experienced with suction-type pumps."

Flygt Electric, Submersible Pumps range from 1½" 85 gpm to 8" 3100 gpm capacity. Heads to 220'—higher in tandem. Designed and built for tough applications, they are adaptable to any dewatering job. Flygts run continuously with little attention, handle a high degree of solids, need no priming, are easy to handle and service. Ask today for literature and an on-the-job demonstration.

WRITE FOR NAME OF YOUR NEAREST DEALER

FLYGT

PUMP BETTER ELECTRICALLY

— USE FLYGT!

WESTERN SALES & SERVICE

Stanco

MFGS. & SALES INC.

1666 Ninth St. (Corner of Olympic & Ninth)
Santa Monica, California

Black Cap are reputed to be equivalent to regular 30-lb. dynamite primers although they weigh only 13 ounces apiece and are no larger than the palm of a man's hand. They are designed for initiating a minimum of 300 pounds of low grade ammonium nitrate in large diameter holes. The 8-oz. Blue Cap is for small diameter holes.

All three products are furnished with a central channel. This permits fast threading of detonating fuse through their entire length. In deep holes, additional primers can be quickly slipped on the fuse at desired intervals.

New Equipment . . .

Continued from page 52

Austin Red Cap, Blue Cap and Black Cap, the primers are said to be unaffected by water and completely insensitive to shock and abrasion with rifle impact sensitivity of zero. As a result, holes can be loaded as soon as drilled when primers are used with detonating fuse. If incomplete detonation of a blast should occur because of improper connections, the primers can be more safely dug out.

Made of special cast high explosive, the primers have a speed of more than 22,000 fps. Red Cap and

Side-Boom Wheel Tractor

Manufacturer: FWD Corp., Department EE, Clintonville, Wis.

Claims: FWD's new "Blue Ox Side-Boom" is a custom engineered wheeled tractor specifically designed for contractors and gas distributing companies to be used in pipe stringing, lowering-in operations and repair work.

Center of gravity on the machine has been lowered radically for maximum stability under extreme boom loads. This feature, combined with the vehicle's hydraulically-controlled counterweight and special 15-in. frame, give the unit a lift capacity of 17,500 pounds.

Other features include four-wheel-drive for greater traction, and four-wheel steer plus independent (or simultaneous) controlled right and left hand brakes to allow the shortest possible turning radius increasing the vehicle's maneuverability. High flotation tires permit the machine to operate freely on city streets without damage to paved surfaces, walks, curbs, boulevards and landscaping.

The driver sits behind the boom for better visibility and control of the boom action. The unit can be moved quickly from job-to-job at speeds up to 47 mph. In addition, the Blue Ox Side-Boom provides a creep speed of one-half mile per hour, through the use of a low range.

Optional equipment includes backfill blade; hydraulic axle stabilizers; and 16:00x20—14 ply tires.

Rock Ripper

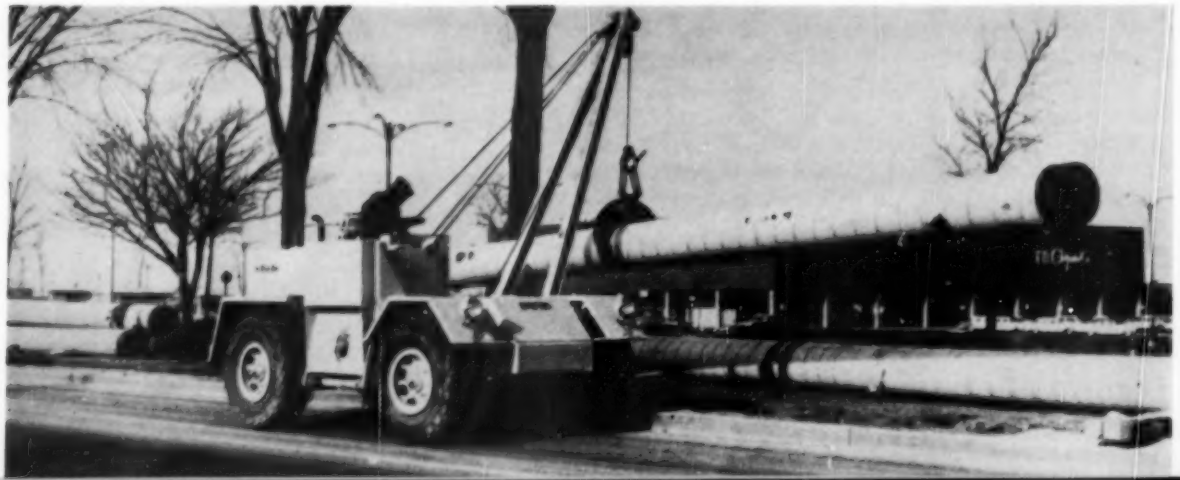
Manufacturer: American Tractor Equipment Corp., Department EE, 9131 San Leandro Blvd., Oakland, Cal.

Claims: An extra-heavy duty model ATECO rock ripper is designed to match the performance features of the Caterpillar D7.

The new HR-D7 ripper includes larger hydraulic cylinders and rods; heavier tool beam and swing brackets; six inches more tool beam ground clearance; and straight-line draft. Heat-treated alloy steels are used extensively for extra strength.

Traditional features of Mack Wooldridge design are retained. The ripper balances dozer weight for increased traction, and swivel-mounted shanks permit easy steering even while ripping full depth. Various shanks and points are interchangeable to meet all job conditions.

Maximum ripping depth is 42



inches. Swing brackets will take straight or curved shanks up to 42 inches, and specials such as cable layer and subsoiler shanks. Replaceable boots and points are available, including the wing-foot attachment for lifting and fracturing action.

ATECO rippers are also available for Caterpillar D6, D8 and D9 tractors and 933, 955 and 977 Traxcavators.

Hydraulic Hoe Attachment

Manufacturer: Bucyrus-Erie Co., Department EE, South Milwaukee, Wis.

Claims: Bucyrus-Erie offers a hydraulic hoe attachment, designed for hoe or front end loader application with 22-B crawler machines. The unusual machine adaptation is particularly advantageous for big production trenching in cramped, congested quarters or in areas normally restricted to smaller, less capacity excavators.

Outstanding features include a 15-ft. boom; a hydraulic "Hoe-Down" device which acts as a hydraulic brake to hold down the boom; and push-button hydraulic-powered wrist action for a 1½-yd., 72-in. wide dipper. The trench-wide dipper (84-in. with side cutters) has two cutting edges with teeth for operation as a hoe or as a shovel-front-end loader.

In addition to capacity-boosting advantages, the combination of boom hold down pressure and trench-wide wrist action dipper eases leveling and cleanout, relieving hand labor for other work.

Self-Propelled Tamper

Manufacturer: Bros, Inc., Road Machinery Div., Department EE, 1057 10th Ave. S.E., Minneapolis 14, Minn.

Claims: A new Bros self-propelled sheepsfoot tamping roller is designed to speed consolidation of materials on large earthfills such as dams, air fields and highways.

This Bros SP-3DT machine weighs 81,000 pounds empty and has an uninterrupted rolling width of 15 feet 9 inches. This width provides exceptional stability for rolling on slopes and inclines. Three 130-hp diesel engines drive the roller's three drums. Speeds from 1.5 mph to 7 mph in both forward and reverse eliminate turn-arounds at the end of a course.

Each drum oscillates to provide

Continued on page 58

NOT in the Contract

The tea party was going full swing. One old biddie remarked to another, "You say your daughter didn't get home from the party until 2:30 this morning. Why, my daughter was home before midnight."

"Yes," the mother said, "but my daughter walked home."

News reporter: "Will there be any change in men's pockets this year?"

Fashion designer: "Very little."

Judge: "Now, sir, you may, if you wish, challenge any member of the jury."

Prisoner: "Well, I'm not in very good condition, but I believe I can lick that little guy in the end seat."

One cave-man to another: "Don't tell me there's no connection. We never used to have weather like this before they used bows and arrows."

The couple was expecting another child, and it appeared that the problem of breaking the news to their five-year-old son could be put off no longer.

"Son," the father said, "the stork has been flying above our house for some time now, and I notice that he has been swooping pretty close to the housetop during the past few hours."

"Gosh!" replied the boy, "don't tell Mother. It might scare her, and she's pregnant you know."

"Better make that almost, Gus!"

The operator was about to close the doors of the crowded elevator when a tipsy gentleman pushed his way in. As the car started up he tried to turn around to face the door, but was wedged in so tightly he couldn't move.

The other passengers stared into his bloodshot eyes with growing embarrassment. Finally, when the general strain became unbearable, the tipsy man cleared his throat and said: "I eckspect you people are all wonderin' why I called thish meetin'? Well, first thing, our westbound freight is terrible outta balance . . ."

"It has been said that a man who squeezes a dollar never squeezes his wife," read a collection letter. "In looking over your account, it has occurred to us that your wife is not getting the attention she deserves."

"Could I try on that red dress in the window?" asked the pretty young thing.

"There's no need to do that," the elderly saleslady answered coldly. "We have several fitting rooms."

The doctor put his arm gently around the husband's shoulder and said: "I'm sorry to have to tell you this, old man, but your wife's mind is completely gone."

"I'm not a bit surprised," the husband replied. "She's been giving me a piece of it every day for the past 22 years."

Two Indians watched the white man building a lighthouse. One night after it was completed, the Indians took up their accustomed stations as a thick fog started to roll in.

"Ugh," said one Indian to the other. "Light shine, bell ring, horn blow, but fog come in just the same."

The department store proprietor approached the personnel manager.

"What's the idea of hiring a cross-eyed man for a store detective?" he demanded.

"Well, just look at him," the manager calmly replied. "Can you tell whom he's watching?"

NEW CAT DW20-482 TEAM

HAULS BIG LOADS FAST, INCREASES PRODUCTION

Six-minute cycles on nearly a two-mile round trip hauling 24 bank cu. yd. of slow-loading sand! This is the production from two big Cat DW20G Tractors with new 482 Scrapers speeding road construction on State Highway No. 99 in Marshall County, Oklahoma. The big rigs are owned by the W. D. Jeffrey Construction Company of Fort Smith, Arkansas, contractors on this job.

"The new DW20 and 482 Scraper have a faster cycle and loading time which means higher production," comments Superintendent "Smoky" Branson. He adds, "Down time on equipment is minimum."

The DW20's 345 HP results in 12% increase in rimpull over the former model. This provides up to 20% faster travel speeds under similar haul road conditions. The 482 Scraper is teamed with the DW20 for high production with its 24 cu. yd. struck load capacity (34 cu. yd. heaped). On this job the DW20-482 combination loaded in .93 minute.

Field reports from contractors all over the country confirm the productive efficiency of the big DW20-482 combination. Get the facts from your Caterpillar Dealer. He can prove—right on your job—that economical, high production is built into the new DW20 and 482.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

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PICK THE DW20-482 TO BREAK PRODUCTION RECORDS

Loosens
FROZEN
PARTS
FAST!
Handy
Won't
Leak
Shoots
3 Feet
KANO
Aerokroil
DIRECTIONS
NO LABORATORIES
Same formula as famous Kroil that has pleased 14,000 industrial users for 10 years or more.
Loosens stuck together metal parts, bushings, bearings, bolts, screws, pipe, etc., "anything from an embalmer's needle to a bulldozer," one customer said.
"Like an extra employee," said another. "Turned rust into mush, put $50,000 equipment back to work."
You too can get these results.
Try Aerokroil at our risk. Send $2 cash, and we'll pay postage.
KANO LABS. 1083 Thompson Lane Nashville 11, Tenn.
12-OZ. CAN $2.
F.O.B. NASHVILLE
CASE OF 12 $18.75

New Equipment . . .

Continued from page 55

uniform compaction pressures. Drums are 5 feet in diameter and are 5 feet wide. Tips of the tamping feet are replaceable when worn. Special length tamping feet are available to meet Bureau of Reclamation specifications. Weight per foot of drum length is 4,700 pounds when roller is empty.

Over-all dimensions of the SP-3DT are: length, 29-ft. 6-in.; width, 17-ft. 10-in.; and height, 11-ft. 6-in.

Air Filter

Manufacturer: Purolater Products, Inc., Department EE, Rahway, N. J.

Claims: Purolator two-stage air filters—two filter elements in a single housing, with each element independently sealed—are designed for both heavy-duty automotive and industrial engines.

The air-filter is a genuine two-stage unit. One element provides positive protection in the event the other is damaged.

The filters give more efficient protection where equipment is continually operated under abnormally dusty conditions such as construction and mining, and sand, cement or gravel hauling.

Both the first and second stage elements operate independently at 99.8% efficiency at all engine speeds. If the first stage element and sealing gaskets operate at maximum efficiency before requiring service or replacement, the second stage element will last indefinitely.

The elements are made from a plastic impregnated cellulose with a new depth type radial pleating for greater dirt holding capacity. The porosity of the filter media for both elements is extra fine.

They are rated from 450 to 1150 cfm with an exceptionally low initial restriction. Extensive field testing has proven that the advantage of having a low initial restriction will provide element life anywhere from 600 to 2,000 hours continuous use.

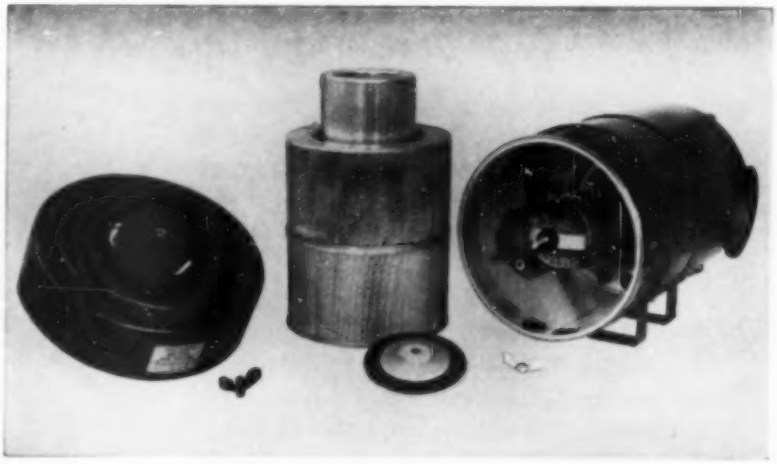
Mounting straps, rainhoods, and outlet adapters have also been designed and are available for installing in the field.

Sliding Choker Hook

Manufacturer: Crosby-Laughlin Div., American Hoist & Derrick Co., Department EE, Box 570, Fort Wayne, Ind.

Claims: Qualities of safety, long life and high strength without excess weight are incorporated into a new Crosby-Laughlin sliding choker hook. The hooks are drop-forged and heat-treated for greatest possible strength, have a wide throat to accommodate heavy thimbles and are load-rated for safety.

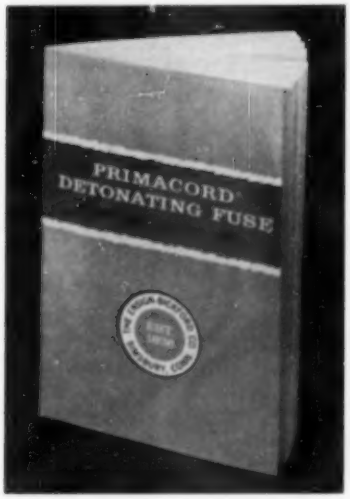
The sleeve and eye design insures free movement on the wire rope, allowing quick, smooth adjustment for all sizes of loads. It is light in weight for safer, easier handling. The sliding choker hook is available in four sizes, with a safe working load capacity ranging from 2,500 pounds to 8,000 pounds.



LITERATURE FOR EARTHMOVERS

Subject: **Detonating Fuse**

Content: Ensign-Bickford offers a 72-page catalog and manual, pocket size, which illustrates and describes Primacord detonating fuse. The catalog section covers the company's six standard brands of detonating fuse for commercial



blasting. The manual illustrates and describes approved operations in priming, loading and hooking up Primacord for instantaneous and delayed firing. Text covers use in mining, stripping, quarrying, pipeline and construction work.

Where to get: Ensign-Bickford Co., Department EE, Simsbury, Conn.

Subject: **Scraper, Grader**

Content: Two new pieces of literature covering Allis-Chalmers construction machinery are available. A 20-page catalog (MS-1357) reviews the recently introduced 340-hp, 30-yd. heaped capacity TS-360 motor scraper. Full-color illustrations show the new scraper in action. Drawings in two colors highlight construction, engineering and operating features. Specifications are included. The other item is a 16-page catalog (MS-1319) covering the Model D motor grader. It is complete with cutaway view of the grader; illustrations of its gasoline or diesel engine power plant; and photos of various components. Also shown and discussed are attachments and accessories. Specifications are included.

Where to get: Allis-Chalmers Construction Machinery Div., Department EE, Milwaukee 1, Wis.

Subject: **Dragline Bucket**

Content: Page's Dual-Hitch automatic dragline bucket is described in a 6-page brochure. The bucket can be adjusted in minutes to dig at any desired depth above or below the fairlead with the same degree of digging efficiency and capacity. It is specifically designed to meet the exact digging requirements of various job applications. Ask for brochure DH-360.

Where to get: Page Engineering Co., Department EE, Clearing Post Office, Chicago 38, Ill.

Subject: **Single-Acting Hammers**

Content: McKiernan-Terry's line of six single-acting pile hammers for steam or air operation is described in a 6-page bulletin. The single-acting hammers drive heavy piles with low velocity blows above or under water. Accompanying data covers standard attachments, bearing calculation charts and hammer operation. Ask for bulletin 691.

Where to get: McKiernan-Terry Corp., Department EE, 100 Richards Ave., Dover, N. J.

Subject: **½-Yd. Crane-Excavator**

Content: A 12-page catalog describes the Unit model 614, a ½-yd. excavator-crane convertible to dragline, trenchoe, clamshell and magnet attachments. Features such as interchangeable disc-type clutches, straight-in-line engine mounting, traction brakes and full vision cab are described and illustrated.

Where to get: Unit Crane & Shovel Corp., Department EE, Milwaukee, Wis.

Subject: **Terraload'r**

Content: A 16-page catalog features the Case W-10 Terraload'r. Both the operation and construction of the 6,500-lb. capacity rubber-tired tractor shovel are described in the well-illustrated booklet. The 4-wheel drive, rear-wheel steer unit features full-power shift and torque converter drive. A choice of SAE rated buckets from 1¼ to 2⅞ cubic yards is offered, plus a number of interchangeable working tools including brush stackers, dozer blade, snow plows and material handling forks.

Where to get: Case industrial dealers, or J. I. Case Co., Department EE, Racine, Wis.

Subject: **Operator Publication**

Content: A group of Caterpillar dealers are now publishing a book for equipment operators aptly entitled *The Operator*. The magazine contains 16 pages of operating aids, job stories, "how-to" tips, maintenance hints, instructions, humor

and news items for owners as well as operators of construction machinery. First issue of the every-other-month publication was mailed in September.

Where to get: Caterpillar dealers or Caterpillar Tractor Co., Department EE, Peoria, Ill.

TO ADVERTISE: All advertising in this section is payable in advance. Rate $1.00 per line, or $12.00 per inch of 12 lines. Minimum charge $4.00. No discounts; no commissions. Please count your copy carefully to avoid delay. Each line contains 41 characters. Count spaces and punctuation as one character each. Be sure to enclose the correct amount of money with your order. Rates and conditions subject to change without notice. Closing date—10th of preceding month. Example: January closes December 10th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the listed address. If box number is used, mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

LARGE SHOVELS, CRANES, DRAGLINES — 3 YDS. & UP

EUCLIDS
Rear, Bottom and Scrapers

12-yd. Bucyrus-Erie dragline.
9-yd. Bucyrus-Erie dragline.
6½-yd. Bucyrus-Erie shovel.
4-yd. Bucyrus-Erie shovel.
4-yd. Bucyrus-Erie dragline.
3-yd. Bucyrus-Erie shovel.
2½-yd. Bucyrus-Erie shovel and dragline.
1½-yd. Bucyrus-Erie shovel.
5-yd. Manitowoc shovels and drags.
6-yd. Lima dragline and shovels.
Large stripping shovels.
Other equipment available, not listed above.

WILLIAM LUBRECHT, III
Construction Equipment
311 W. Diamond Ave. Hazleton, Pa.
Phone: GLadstone 5-4041 or 5-0523

HEAVY EXCAVATION EQUIPMENT
DRAGLINES, SHOVELS, CRANES, DRILLS, TRUCKS

15-W B-E elec. drag, 215', 12-yd.
450-W B-E diesel drag, 165' w/extra 10, 12, 13 & 14-yd. buckets.
9-W B-E elec. drag, 165', 10-yd.
9-W B-E diesel drag, 165', 12-yd.
7-W B-E diesel drag, 140', 7-yd.
7400 Marion diesel drag, 175', 13-yd.
7400 Marion elec. drag, 175', 12-yd.
1855 P&H diesel drag, 130', 10-yd.
625 Page diesel drag, 160', 9-yd.
621-S Page diesel drag, 125', 7-yd.
200-W B-E diesel drag, 125', 6-yd.
2400 Lima elec. drag, 130', 6-yd.
2400 Lima diesel drag, 130', 6-yd.
4500 Manitowoc drag, 120', 5-yd.
120-B B-E elec. drag, 115', 5-yd.
3900, 3500, & 3000 Manitowoc cranes.
111-M Marion drag, 100', 4-yd.
1601 Lima 4-yd. shovel/drag.
1055 P&H drag, 80', 4-yd.
1201 Lima dragline, 85', 3-yd.
54-B B-E drag, 80', 2½-yd.
5560 Marion 26-yd. elec. shovel.
5323 Marion 18-yd. elec. shovel.
190-B B-E 8-yd. elec. shovel.
151-M Marion 7-yd. elec. shovel.
1600 P&H 6-yd. elec. shovels.
170-B B-E 6-yd. elec. shovel.
4161 Marion 6-yd. elec. shovel.
2400 Lima 6 yd. Std. & H.L. shovels.
120-B B-E & 4121 Marion 4-yd. elec. shovels.
1955 P&H 3-yd. H.L. shovel.
111-M Marion 4-yd. standard & H.L. shovels.
1201 Lima & 54-B B-E standard shovels.
#6 Northwest 1½-yd. standard shovel.
Model T-650 Reich drill truck mtd. rotary and down-the-hole.
Ingersoll-Rand truck mtd. & crawler mtd. Drillmasters.
Keystone #50 truck mtd. Stardrill.
Euclid trucks, rear & bottom dump; dozers, etc.

FRANK SWABB EQUIPMENT CO., INC.
313 Hazleton Nat'l Bank Bldg.
Hazleton, Pa.
GLadstone 5-3658

LARGE SHOVELS, CRANES, DRAGLINES — 3 YDS. & UP

Marion 151M #8850
Marion 482 #6353
Marion 4161 #8197
Bucyrus-Erie 54-B Diesel #95643
Bucyrus-Erie 54-B Diesel #103533
Bucyrus-Erie 120-B #62821

All equipment subject to prior sale.
Contact:

PICKANDS MATHER & CO.
Purchasing Department
700 Sellwood Building
Duluth 2, Minn.

7-W electric dragline, serial No. 741, equipped with 180-ft. long boom, 6-cu. yd. bucket, and arranged for power supply of 3-phase, 60-cycle, 2,300 volts. Good working condition. Located in Middle West. Write:

EXCAVATING ENGINEER
Box 3756 South Milwaukee, Wis.

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

Bucyrus-Erie 38-B shovel 1½-yd. serial No. 101377 with Cat D13000. Very good condition. $31,000
Bucyrus-Erie 22-B heavy-duty backhoe, GMC 3-71 diesel, serial No. 119906. Less than 400 hours. $27,000
Lorain 41 shovel ¾-yd. Cat D4600 engine, S/N 14597. ..... $6,000
Vibro-Plus CH-30 compactor, 3.5 tons, dynamic impact 7 tons, Waukesha diesel. Demonstrator, like new. $5,750
Kiesler 1½-yd. rehandling clam with counterweight type H. Like new. $1,900
Esco ¾-yd. orange peel model 379. Excellent. $2,125
American double-drum sheepsfoot roller, model AD96 with wedge type feet, 48" width drums, diameter 60", good condition. $2,000
Model 25 Northwest backhoe, ¾-yd. Caterpillar D4600 engine, very good condition. $10,750
Model 300 International tractor with Wain-Roy backhoe, model H-700, 12" bucket, both 1956 models in excellent condition. $3,750
Wooldridge model BB120, 14 to 18-yd. scraper, tires 18.00 x 24—65% of new. Scraper in good condition. $2,500
Model C Scoopmobile with 22' tower and pallet forks, with ¾-yd. bucket excellent condition, Chrysler gasoline engine. Capacity 4,000 pounds. $3,900
Model 25 Bay City shovel, dragline, backhoe combination. Serial No. 6465, 1952 model, Caterpillar 315 engine, very good condition, $10,800. With any one front, Add $1,250 for each additional front.
Bucyrus-Erie 15-B ½-yd. dragline, standard tracks 16" treads, 35' boom, very good condition throughout, 1959 model with less than 2,000 hours. $15,525
K-12 Insley dragline with 45' boom, fairleads. Serial No. 11289, 1955 model, Buda 326 gasoline engine. Machine in good condition throughout. $8,500

CONTRACTORS SUPPLY
620 E. 18th St. Kansas City, Mo.
Phone: BA 1-7788

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

AT DALLAS, TEX.
DRAGLINES

22-B Bucyrus-Erie dragline, 35' boom, Cat diesel engine #921141, reconditioned.
22-B Bucyrus-Erie comb. 50-10 dragline, 45' boom, Cat D318 diesel engine, #73017, reconditioned.
½-yd. P&H dragline, #59060.
E Quickway shovel mounted on white tandem truck.
Model 41 Lorain dragline #14432.
Model 25, ¾-yd. Northwest backhoe, GM diesel engine, machine #11313, reconditioned.
25 Northwest backhoe #19082, reconditioned.
25 Northwest backhoe, Cat diesel engine, #19080, reconditioned.
25 Northwest dragline, 35' boom, Cat diesel engine, #19078, reconditioned.
Model L Insley dragline & clamshell, #7389.
Model K12 Insley backhoe, #55690.
Model L Insley backhoe, #7508.
Model K12 Insley dragline w/35' boom, U9 IHC gas engine, #1619.
Model 25 Northwest truck crane, 35' boom, M-M power unit mounted on Dart carrier, #11957, reconditioned, excellent.

ATTACHMENTS

3—Backhoe attachments for Northwest 25, condition good.
Backhoe attachments for TL-25 Lorain, good condition.
Backhoe attachment complete for T-35 Schield-Bantam, condition excellent.
Backhoe attachment complete for LS-50 Link-Belt.
Shovel attachment for TL-25 Lorain, condition good.
Shovel attachment complete for LS-50 Link-Belt.
Shovel attachment for 362 Marion, 1½-yd. condition excellent.

AT HOUSTON, TEX.

1—Bucyrus-Erie 20-A hoe equipment with ¾-yd. Esco bucket for 22-B (cambered boom).
1—Bucyrus-Erie Unit 20-A hoe equipment with ¾-yd. B-E bucket for 22-B (straight boom).
1—Bucyrus-Erie 22-B, 40-10 hoe, s/n 119174, IHC UD-525 diesel, with Esco bucket, Unit 76A tractor type mounting, unit 19A swing brake.
1—Bucyrus-Erie 22-B (std.) dragline, s/n 107904, Cat D318 26" shoes, 40' boom.
1—Bucyrus-Erie 22-B dragline, s/n 56343, UD-14 diesel, 45' boom, std. tracks.
1—Lorain 30, ½-yd. shovel, s/n 10198, gas engine.
1—Lorain TL-20 dragline, s/n 15456, 35' boom, Cat D4400 diesel, 22" track shoes.

AT LUBBOCK, TEX.

1—Bucyrus-Erie 22-B hoe, straight boom, UD-525 IHC diesel engine, std. flat tracks, #114600, condition good.
1—Bucyrus-Erie 22-B dragline, 35' boom, Cat D318 diesel engine, std. flat tracks, #106901, condition good.

BROWNING-FERRIS MACHINERY CO.

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HOUSTON	
2619 Texas Ave.	**CA 5-2231**

Used Browning truck crane, serial #3719, 70' boom, outriggers, 20-ton capacity. Mounted on Hendrickson carrier, model 500 ct. Tires good. Price, $12,000.

LLEWELLYN MACHINERY CORP.
P. O. Box 35-646 Miami 33, Fla.
Phone HI 4-7481

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

BACKHOES

Bucyrus-Erie 15-B backhoe, S/N 50787, ½-yd. capacity, 20" tracks, Buda HF 326 gasoline engine. As insp. $7,500

Bucyrus-Erie 22-B S/N 119702, ¾-yd. backhoe, Cat D315, diesel engine w/ elec. starter. Like new $27,300

Bucyrus-Erie 15-B S/N 27473 backhoe, ½-yd., 20" tracks, Buda gasoline engine. Operating condition $5,500

BULLDOZERS

International TD-24 tractor, cc. guard, 24" tracks, pull hook, canopy, dozer, double drum PCU. Good undercarriage. Good operating condition. $10,500

International TD-18A tractor, cc. guard, 20" tracks, canopy, hydr. dozer. Operating condition $4,500

CLAMSHELLS

Lorain 820 2-yd. combination clamshell, crane, drag line, 65' boom, pendant suspension, 34" tracks, long undercarriage, tag line, w/Cat D13000 diesel engine. This machine has been completely remanufactured from top to bottom and is in "like-new" condition. Inquire for price.

TRUCK CRANES

Northwest #25 truck crane, S/N 12454, 70' boom, telescoping boom stop, outriggers and floats, Dart carrier, 10 Michelin 11:00 x20 tires, gas engine. Good operating condition—As inspec. $18,350

SHOVEL ATTACHMENTS

Bucyrus-Erie shovel attachment for 38-B complete with deck machinery and standard 1½-yd. dipper. Like new. $8,900

Bucyrus-Erie shovel attachment for 38-B complete with deck machinery and an Esco 1¾-yd. dipper. Good cond. $5,000

Bucyrus-Erie tunnel shovel attachment for 38-B consisting of 15' boom, 12' handle, 1½-yd. dipper. Very good cond. $4,500

Bucyrus-Erie backhoe attachment for 22-B with a ¾-yd. dipper. Good cond. $1,500

Bucyrus-Erie shovel attachment for 15-B, complete with ½-yd. dipper. Like new. $1,000

Northwest #25 fairlead attachment. Very good condition $520

Lorain 820 fairlead attachment. Good condition $550

Haiss ¾-yd. clamshell bucket, S/N K13402. ..... $1,000

Pettibone Mulliken 2-yd. dragline bucket. $2,200

All items subject to prior sale.

H. O. PENN MACHINERY CO., INC.
140th St. & East River — New York 54, N.Y.

BACKHOE & CRANE

1—Link-Belt model LS-80 crane with 50' boom, Rudomatic tagline, Buda gas engine, s/n 7074.

1—Link-Belt model LS-60, Buda gas engine, s/n 8128.

1—Bucyrus-Erie 10-B crawler-mounted backhoe, s/n 16626; powered by Buda model 326-hp. 6 cylinder gasoline engine, s/n 11579. Backhoe with 14' boom, 4'6" stick, 29" wide bucket at side cutters with 3 teeth mounted on 9' long x 7'8" wide crawlers with 14" pads.

DRAGLINE

1—Bucyrus-Erie 10-B gasoline powered backhoe, standard cats, excellent condition, s/n 20429.

MISCELLANEOUS

1—LeRoi 315 air compressor on 4 pneumatic tires, 7 or 8 years old.

1—Ruhr M-1—½-cu. yd. heavy-duty grapple, new, excellent buy.

1—Wayne 36" rider industrial vacuum pick-up sweeper, demonstrator, 2 years old.

1—CMC Jetcrete with all accessories. Excellent condition, practically new with all extra accessories.

1—Used Kennedy-VanSaun revolving scrubber screen, 48" dia. x 21' long, in excellent shape and complete with all new parts including extra scrubber sections and new sizing screens.

2—Caterpillar D13000 power units in good shape with radiator less clutch, s/n 3R8157SP and 3R8098SP.

1—Clark 10,000-lb. fork lift, solid tires.

S. M. CHRISTHILF & SON, INC.
Timonium Rd. & Harrisburg Expressway
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Link-Belt K585 dragline, long wide crawlers, 80' boom, Cat 17000 direct power, excellent condition.

EUCLID SALES & SERVICE
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SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

Bucyrus-Erie 54-B shovel #100761, GMC diesel model 6-110, Torcon converter, 36" pads. Rebuilt.

Bucyrus-Erie 54-B shovel #107758, Buda 6DC-1879 engine. Rebuilt.

Bucyrus-Erie 54-B shovel #51079, Buda engine model 6DC1879.

Bucyrus-Erie complete 54-B shovel attachment.

Marion model 362M shovel #21547, GMC 6030C diesel, new 1956.

Four Caterpillar DW20 scrapers #11C880, 891, 892, 901, excellent condition.

W. I. CLARK CO.
P. O. Box 301 — New Haven, Conn.

SHOVELS, CRANES & ATTACHMENTS

Bucyrus-Erie model 22-B, ¾-yd. dragline and clamshell combination, 40' boom. Powered by International UD-525 diesel engine. Less than 3 years old. From our rental fleet. Excellent condition. $18,750. FOB Evansville, Ind.

Bucyrus-Erie model 15-B, ½-yd. dragline with 35' boom, 20" treads. Powered by International UD-9A diesel engine. $9,500. FOB Louisville, Ky.

Lorain model 820, 2-yd. shovel, powered by Caterpillar D13000 diesel engine. $13,000. FOB Elizabethtown, Ky.

Lorain model 40, ¾-yd. shovel on crawlers. Powered by gasoline engine. $4,500. FOB Elizabethtown, Ky.

P&H model 255-A, ¾-yd. shovel, crawler mounted. Powered by Caterpillar 315 Diesel engine. $8,500. FOB Elizabethtown, Ky.

General model 207, ¾-yd. dragline with 45' boom and fairleads. Powered by Waukesha gasoline engine. $5,250. FOB Evansville, Ind.

Unit ½-yd. shovel, powered by Chrysler Industrial gasoline engine. $3,000. FOB Evansville, Ind.

Write—Wire or Phone Jim Waddell

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COMPRESSOR AND AIR TOOLS

1—Ingersoll-Rand IKA-210, powered by IHC-UD-14A, repaired, serviced, cleaned and painted.

1—Jaeger 210, powered by Continental 6 cylinder B-427 gasoline engine, repaired, serviced, cleaned and painted.

2—Joy crawler drills, TM-450 drifters: clean, serviceable condition, some new spare parts for drifter.

EXCAVATORS

1—Northwest 104 dragline, 35' boom, fairlead, Cat engine, workwise and serviceable as is. Make an offer.

1—P&H 600 shovel, old but serviceable, make offer.

1—Northwest 25 dragline, 35' boom, fairlead, Cat 4600 engine. Workwise, serviceable as is.

1—Quickway model "L" combination shovel, hoe, crane, dragline, 30' boom, pin connected, pendant suspension, fairlead, I.H.C. U9 power, mounted on FWD commercial single rear axle chassis, repaired, serviced, cleaned and painted.

1—Insley K-12 dragline, 30' boom Chrysler 8 engine, repaired, cleaned and painted.

1—Lorain TL25 dragline, fairlead, 35' boom Cat D315 engine, wide tread, repaired, cleaned and painted.

1—Link-Belt LS-71 dragline, 45' boom, fairlead, I.H.C. UD-14A engine, repaired, cleaned and painted.

1—Lima 34 dragline, fairlead, Cat. D318 engine, workwise, serviceable as is.

1—Lima 604 dragline, 50' boom, pendant suspension, fairlead, Cummins HIS engine, repaired, serviced, cleaned and painted.

EXCAVATOR ATTACHMENTS

1—Lima 604 shovel attachment complete, good condition, serviceable as is.

1—Lima 34T hoe attachment, 30" dipper, excellent condition.

1—Bucyrus-Erie 22-B shovel attachment complete, clean, serviceable. A bargain.

1—Bucyrus-Erie 38-B shovel attachment complete, excellent condition, 2-yd. Esco dipper.

1—Bucyrus-Erie 120-B dragline attachment, fairlead, complete deck equipment, good condition.

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

1—Osgood hoe attachment, boom, gantry, arm with 36" plate dipper, serviceable condition.

1—Schield Bantam M-49, shovel attachment, good condition.

TRACTORS—SCRAPERS—TRUCKS

1—Allis-Chalmers HD-16 GarWood hydraulic angle dozer, repaired, serviced, cleaned and painted.

3—Euclid 7-TDT tractors with 14SH scrapers, Cummins power, good rubber, serviceable, workwise as is, or repaired, cleaned and painted.

2—Euclid 14-TDT tractors with 21SH scrapers, Cummins power, fair rubber, workwise as is, or repaired, cleaned and painted.

2—Euclid 23-TDT tractors with 122 W bottom dump wagons GM 6-110 engines, good condition, located at Los Angeles.

2—Caterpillar DW20's, turbo charged engines, serviced, repaired, cleaned and painted. Good rubber. Ready to go to work.

2—Koehring WD-60 Dumptors, GMC engines. New or recap tires on drive wheels, repaired, serviced, cleaned and painted.

CRUSHING AND ASPHALT EQUIPMENT

1—Barber Greene 848 asphalt plant complete, Cleaver Brooks 125 boiler, Cat 13000 generator set, all mounted portable, ready to go to work. See this plant. It's a good rig.

1—Standard maintenance type asphalt distributor, trailer mounted, complete, cleaned, serviced and painted.

1—Woods 54 Roadmixer, PTO for 2U Series Cat D8, Chrysler engine on accessories. A clean serviceable machine, ready to go to work.

1—Universal 20 x 36 roller bearing jaw crusher, cast base, one grooved flywheel, mounted on steel wheel chassis with 24" x 25' conveyor.

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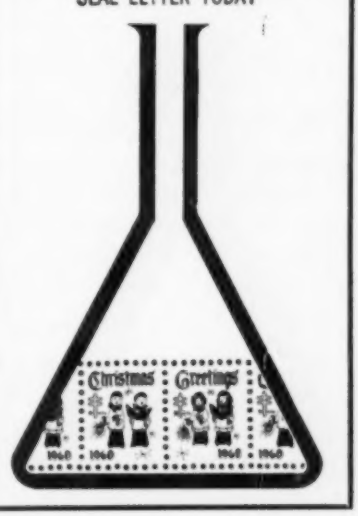

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

CRAWLER TRACTORS

K-209 Allis-Chalmers model HD5G with 1-cu. yd. hydraulic loader. This unit has been completely rebuilt in our shop. Carries a 90 day guarantee.

K-212 Allis-Chalmers model HD5G with 1-cu. yd. hydraulic loader. Tractor has been rented a short time since rebuilding completely.

K-219 Allis-Chalmers HD6G with 1½ cu. yd. hydraulic loader, completely rebuilt and carries 90 day guarantee. A very good machine.

K-225 Allis-Chalmers HD9G with 2-cu. yd. hydraulic loader. Completely rebuilt and is guaranteed for a period of 90 days.

K-229 Allis-Chalmers model HD11B with hydraulic dozer. This tractor is being completely rebuilt in our shop at this time and will be an excellent buy. Will carry 90 day guarantee.

K-230 Allis-Chalmers model HD15 tractor with hydraulic dozer. Machine is being rebuilt in our shop at this time and will be a good buy.

K-233 Allis-Chalmers HD21A with rear power control unit and cable dozer. Completely rebuilt and carries 90 day guarantee.

K-283 Caterpillar D8 with rear power control unit. An older machine in fair condition.

K-252—K-255 Two Caterpillar D4 Tractors with 1-yd. hydraulic loaders. All necessary repairs have been made and these units are ready to go.

K-259 International TD14 tractor with hydraulic buildozer. Fair condition.

K256 Caterpillar D7 tractor with T7 cable operated loader. Good operating condition.

CRANES

Bucyrus-Erie 51-B combination crane and clamshell. New in 1957. Has 85' boom, mast and pendant suspension, Caterpillar D337 F diesel engine with torque converter, standard propel, third drum, long-wide tracks.

Bucyrus-Erie 38-B combination crane, clamshell and dragline. New in 1955. Has 85' boom, independent propel, long-wide tracks, mast and pendent suspension, third drum, Caterpillar D13000 diesel engine.

K-270 Bucyrus-Erie 38B combination crane, clamshell and dragline. Has 75' boom, GMC 6-71 diesel engine. All necessary repairs are being made and this machine will be in excellent condition when completed. Has long-wide tracks, independent propel, extra counterweight.

K-264 Lorain ⅝-cu. yd. dragline. Has new GMC diesel engine. All necessary repairs have been made and machine is in good condition.

K-268 Bucyrus-Erie model 22B hoe. Has Cat diesel engine, standard tracks. An older machine in fair condition.

K-265 Quickway ⅝-yd. truck-mounted hoe. Fair condition.

K-266 Bucyrus-Erie model 22-B crane-clamshell. Has 40' boom, long tracks, extra counterweight. Good condition.

K-304 Insley K12 combination crane and dragline. This unit is in fair condition.

Northwest model 80D shovel with 2½-cu. yd. Amsco bucket. Has 30" tracks, 14'9" long overall, powered by Murphy diesel engine. Has been used five months since reconditioning.

MISCELLANEOUS

K-276 Allis-Chalmers TL20 wheel loader with 3-cu. yd. bucket. This machine has been rented for a short time and represents a considerable savings over the price of a new one.

K-262 Cleveland model 140 wheel type trencher. Has 16" buckets, 21½" cut. Machine has been rented very little since rebuilding. Very good condition.

K-271 Blaw-Knox model 34E dual drum concrete paver. Complete with boom and bucket. Has GMC diesel engine. This paver is in very good condition, ready to go.

K-274 Galion model 101 motor grader. This grader has been used as a rental unit and is in good condition.

K-279—K-280 Two Allis-Chalmers model TS-360 motor scrapers, 15-cu. yd. struck capacity, 20-cu. yd. heaped. All latest changes have been made and these units are in excellent condition.

K-281 Allis-Chalmers model D-14 wheel tractor with Wagner hoe attachment. This unit has been demonstrated a total of one hour only and represents a very good buy.

K-263 Galion 8-10 ton tandem roller. This is an older roller in fair condition.

K-311 Allis-Chalmers model TL12—1-cu. yd. Tracto-loader with gas engine, torque converter. Machine has been completely rebuilt in our shop and is guaranteed.

K-306 20-ton Jahn Lowboy with Reo tractor. This unit is like new.

D. D. KENNEDY, INC.

P. O. Box 177 — Bellwood, Ill.
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Bucyrus-Erie model 10-B dragline, serial No. 88595, with Buda gasoline engine, 28' crane boom. Good working condition $3,500

Bucyrus-Erie Model H-5 Hydrocrane, serial #119382, complete with tagline reel and ½-yd. GP clamshell bucket. Mounted on ten wheel International truck. Entire unit sold new in 1959. Very low hours. Like new condition throughout.

Bucyrus-Erie model 38-B 1½-yd. shovel, serial No. 112162 with Caterpillar D13000 diesel engine, Kohler light plant, standard crawlers with 33" treads. Location—northern New Jersey.

Bucyrus-Erie model 51-B 2¼-yd. shovel, serial No. 62581 with Caterpillar D17000 diesel engine, standard crawlers with 36" treads. Low hours. Reconditioned and in very good condition throughout.

Bay City 45 ¾-yd. backhoe, serial No. 5993 with Caterpillar engine, standard crawlers. Reconditioned and ready to work. $13,750.

Osgood Model 800, serial No. 3569, dragline, 50' boom, extended crawlers, 30" treads, Waukesha gasoline engine. Machine like new with less than 1,000 hours use. .$13,500

Michigan model TMD, T-16 truck crane, serial No. 8046, 60' boom, pendant suspension, Rudomatic tagline, backhoe attachment, mounted on ten wheel factory carrier. Very good condition throughout $13,000

Bucyrus-Erie model 15-B, serial No. 113583, cambered boom backhoe with D315 Caterpillar diesel engine, standard crawlers with 20" treads. Completely rebuilt.$14,000

Bucyrus-Erie Hydrohoe attachment for H-3 Hydrocrane complete with 18" general purpose dipper, 20" utility dipper, 12" narrow dipper and all necessary fittings. Excellent condition. Complete $750

Bucyrus-Erie 22-B shovel front complete with dipper trip, chains and lagging. Good condition $1,500

Lorain ¾-yd. shovel front, Amsco bucket complete with dipper trip. Excellent condition throughout $1,500

Bay City 45 ¾-yd. shovel front complete with dipper trip. Good condition ...$1,500

BINDER MACHINERY CO.
Brighton St., Union, N. J.
MUrdock 8-6060

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

IMMEDIATELY AVAILABLE

2—Mod. 150-B (6 cu. yd.) comb. shovel-dragline, electric, air conditioned. Used less than 7,000 hours ..	$ 210,000	ea.
8—Mod. LRVX Mack tractors w/30-cu. yd. mod. 137W Euclid bottom dump trailers. New 1958	36,500	ea.
10—Mod. PH95A International Payhaulers w/30-cu. yd. mod. PW20 Athey bottom dump trailers. Tractors have new 425-hp G.M. engines	30,500	ea.
10—Mod. DW20 Cat tractors w/30-cu. yd. mod. PW20 Athey bottom dump trailers, 67C Series	27,000	ea.
12—30-cu. yd. mod. MX30 Southwest bottom dump trailers	5,000	ea.
10—Mod. DW20 Cat tractors w/456P Cat modified scrapers, 67C Series	27,000	ea.
10—D8 Cat tractors w/PCU's and dozers, 14A Series.	18,500	ea.
5—D9 Cat tractors w/PCU's and dozers, 18A Series.	26,500	ea.
6—Mod. 12 Cat motor patrols, 8T and 80C Series....	8,500 to 10,500	ea.
9—15-cu. yd. mod. 63TD Euclid end dumps	24,000	ea.
4—60" x 20' Link-Belt HD manganese apron feeders.	12,500	ea.
2—30" x 60" Gruendler single roll impact crushers ..	9,500	ea.
2—6' x 12' Tyler mod. F800 single deck screens	6,000	ea.

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TRINITY DAM CONTRACTORS

10 West Orange Avenue — South San Francisco, Calif.
Phone: PLaza 6-0300, Ext. 279

MISCELLANEOUS EQUIPMENT

Excavator Attachments

Bucyrus-Erie 51-B backhoe—unused.
Bucyrus-Erie 15-B center boom section, 15 feet long—unused.
Lima 34 swing-type fairlead—unused.

POWER SHOVEL CO.
1913 Massachusetts Ave. — Phone LI 7-0636
Indianapolis, Ind.

Tractor Mounted Rock Drills

2—Used TWM-3 Joy Challenger drills mounted on D8 caterpillar tractor—TM-500 drill—22' feed, 20' steel change, AW80 winch.
PRICE: $12,000 ea.
PRICE without tractor: $ 9,500 ea.

1—Used TWM-2 Joy drill mounted on three wheel rubber tired Ford tractor—TM-500 drill—MW-22A Feed, AW80 hoist.
PRICE: $7,500

Above located at our warehouse.

CLYDE EQUIPMENT CO.
PORTLAND, ORE.
Phone: CApital 7-5561

MISCELLANEOUS EQUIPMENT

AIR COMPRESSORS

1—Used Ingersoll-Rand model DR-900 Gyro Flo air compressor, with General Motors 6-110 diesel engine, temperature control switch, air glide cap. control, elec. start, oil bath air intake filters, multiple leaf steel spring suspension, traffic reflectors, A.S.M.E. air receiver, muffler, special fittings for state of Mass., and mounted on four pneumatic tired wheels, complete with standard equipment. Serial number 900LR16248. Tire Size: 7:50 x 20 good condition. The above unit was purchased new in July 1958. It is in excellent condition; the hours worked are 2,290. Priced for quick sale.

1—Used Chicago Pneumatic model 900 class RO-2 two-stage, oil-cooled Cummins NRTO -6-V1 supercharged diesel engine driven rotary portable air compressor. Complete with standard equipment. Serial number 64652. Mounted on 6 x 6 International truck #RED 36126375. Tire size 8:25 x 20. The above unit was purchased new in August 1958. The hours worked are 2,140. Priced for quick sale.

GILL DRILLING EQUIP. CO., INC.
Foxon Rd., North Branford, Conn.
HUbbard 8-7281

Bucyrus-Erie 22-B shovel front, excellent—original crowd and retract cables still on.

RALPH LEE
Gonvick, Minn.

Caterpillar D9 tractor, 19A series with T.C., 9A angle dozer and No. 29 C.C., new track links and running gear 90% good. Completely checked over and rebuilt. Excellent operating condition $32,000

Caterpillar 14A series D8's with 8A angle dozers and No. 29 C.C. Real good operating condition $18,000
Completely remanufactured. $25,000 & up.

Bucyrus-Erie 22-B with 50' crane boom and extra counterweight, tagline. Powered with Caterpillar D318 diesel. Mounted on Maxi carrier w/8 14:00 x 20 tires. Rebuilt completely in our shops $28,500

International TD-6 tractor, excellent condition. Running gear 65% to 70% good. A real nice unit for drawbar work $1,600

Caterpillar model D6 tractor, 9U series, 6A dozer. Double drum rear cable control. Guarded up and with operators guard. Undercarriage components 50% good. Good operating condition $7,500

Allis-Chalmers HD10W, equipped with Buckeye cable controlled angledozer. Also has a single drum rear skidding winch, and a double drum rear power control. Running gear averages 70% good. Good condition $2,500

International TD-18A with angle dozer, cable control. Guarded up. Undercarriage averages 80% good. Checked over in our shop. General appearance excellent. Excellent condition $8,500

International TD-6, wide gauge, with new Holt free-spooling skidding winch, Holt hydraulic angle dozer, with front mounted pump. All the guards including overhead operator guard. This machine has been checked over and repaired as necessary. The appearance is very good. Is in good operating condition. The undercarriage averages 60% good $4,750

Caterpillar D6 tractor, 9U series, guarded up, good tractor or drawbar work....$2,500

International TD-18A-181 series, equipped with C-frame and Allied rear double drum cable control unit, all guarded up, rollers and sprockets, idlers, average 50% good, links 25% good, grousers 10% good. Right hand steering clutch has been overhauled, unit checked over, has hydraulic steering boosters $5,000

Caterpillar D4 tractor, 6U series, equipped with angle dozer, real good condition..$3,750

Allis-Chalmers HD6G shovel loader, serial No. 2254 with 1½ cubic yd. bucket. Worked a total of 3,600 hours since new. Engine completely rebuilt with new liners, pistons, bearings, and head. Checked over master clutch back including final drives, pins turned. Roller and idlers built, very good operating condition, 30-day guarantee. $10,750

International TD-6 with track, crankcase, radiator guards, operator guard. Straight hydraulic dozer. Checked over, repaired. $2,250

MISCELLANEOUS EQUIPMENT

Oliver Cletrac OC-6 tractor with guard equipment, rear mounted skidding winch, Holt hydraulic straight dozer, front mounted on hydraulic pump. All steel operator guard. Good operating condition $2,500

International TD-14, equipped with Isaacson cable controlled angle dozer and Isaacson double drum cable control. Operator guard, roller and crankcase guards. The engine clutch and transmission have been completely rebuilt; rollers, idlers have been rebuilt and new rails installed $8,750

Caterpillar D4 tractor, 60" gauge, 7U series, with track roller guards, radiator crankcase guards, all steel operator guard, rails, rollers, idlers rebuilt, steering and master clutch final drives repaired. No. 4A angle dozer with No. 44 hydraulic control. Also equipped with a LeTourneau skidding winch. Excellent operating condition. 30-day guarantee $7,500

Caterpillar D6 tractor, serial No. 9U 10943, with a 6A angle dozer, front mounted cable control, and Hyster Hyspeed skidding winch. Engine, master clutch, transmission, final drives, steering clutches, all checked and repaired as necessary. Undercarriage averages over 75% good. All guarded up including an all steel overhead operator guard. 90 day Bonded Buy guarantee $14,500

Caterpillar D2 tractor, with No. 44 Caterpillar hydraulic control and 2A Caterpillar dozer. Roller guards. Over $2,100 put into this machine in repairs. In excellent operating condition. Guaranteed for 30 days. Certified buy $4,500

Caterpillar D2 tractor, 5U series with 5-roller non-oscillating frame. Equipped with a new Teale bucket loader, ¾-yd. bucket, running gear averages better than 60% good. The machine has been completely through our shop and engine completely rebuilt including a new block. This machine is guaranteed for 30 days ..$6,500

Caterpillar #25 double drum cable control for D8 .....$1,000

Allis-Chalmers AD45 motor grader, late current model, tires better than 65% good, 13:00 x 24 rubber on all wheels, cab, cab heater, lights, scarifier, and 14' moldboard, all necessary repairs made, excellent operating condition. Used 35 months since new. $7,500

Wooldridge pull-type ripper for use behind D7 or D8, 2-teeth equipped with new shanks adaptors, and points, over $500 in repairs put into rebuilding this ripper. $1,750

LeTourneau No. H3C ripper, equipped with two teeth, two tips 50% good. Balance of ripper in good condition and complete with cable $1,250

Allis-Chalmers model D motor grader. Good operating condition. Four cylinder gasoline engine. 10' mold board, scarifier, 9' dozer in front, rear bucket loader mounted on it, 7:50 x 20 tires, averaging better than 70% good $2,500

Bucyrus-Erie 22-B with 50' crane boom extra counterweight, Tagmaster tagline, powered with a Caterpillar D-318 diesel engine, mounted on a self-propelled Maxie carrier unit with 8 14:00 x 20 tires. Bonded buy, 90 day guarantee $28,500

Pioneer 54 24 roll crusher, portable tandem axle, 11:00 x 20 tires, 4 x 12 Cedarrapids vibrator screen, with 20 horse-powered electric engine. Price on application.

Barber-Greene model 82A heavy-duty paving machine with floating clean-up scraper 14" x 6'5" crawlers, multiple speed-up, notched spirals, 72 horsepower, UD9A International diesel engine. Heavy drive. Price on application.

Carco GY-54 towing winch, 4HD10 or D7 tractors $600

Isaacson heavy duty towing winch for D7 tractors $1,250

Gardner-Denver 105 cubic foot per min. Air compressor, trailer mounted. Good condition $2,250

P&H ¾-yd. shovel, equipped with a 55-ft. crane boom, extra counterweight, tractor type tracks with 20-in. flat grousers, powered with a Chrysler industrial gas engine, three-speed transmission on the upper works. General appearance good $6,500

Pioneer 6-ft. x 30-in. type A, 2-chain with flared sideboards, apron feeder, appears like new. Sells for $2,450 new. Used only 90 days $1,800

Galion 10-ton 3-wheel steel roller, powered with Buda gas engine, engine has been completely rebuilt. Front wheel repaired. Checked and repainted. Put over $1,200 into repairs. Good operating condition, 30-day guarantee $5,750

Portable sawmill on heavy timber base 48-ft. double track, 6-ft. x 9-in. carrier with two knees, single dog, (carriage could be lengthened for long lumber) friction feed works, 56-in. circle saw, 48-in. flywheel, one live feed roll, 25½-in. flat pulley drive, 18-ft. tail rolls. Anti-friction bearings throughout major portion of mill. This is a heavy-duty portable mill ..$3,000

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NOTES from the Manufacturers

Bucyrus-Erie Co., South Milwaukee, Wis., has enlarged the territory for the ZECO Co., its crane-excavator distributor in Minneapolis, Minn. ZECO will add a 21-county area in west central Wisconsin to its Minnesota territory. ZECO handles the complete line of Bucyrus-Erie ⅜ to 5½ yd. crane-excavators; dragline buckets; Transit Machines; Hydrocranes; and 250-ton capacity railroad cranes. Main office and shop facilities are located at 2929 University Ave., S.E., Minneapolis.

Detroit Diesel Engine Div., General Motors Corp., Detroit, Mich., has appointed Spokane Diesel, Inc., Spokane, Wash., distributor for eastern Washington and 10 adjoining counties in northwest Idaho. Complete service facilities including dynamometer test on engine overhauls and inspection of all new GM diesels entering the area in manufacturers' equipment are under the direction of Orville Bartlett, service manager. The parts department is managed by Albert Belter. The company is located at 704 E. Pacific, Spokane.

Joy Mfg. Co., Pittsburgh, Pa., has appointed Clair C. Ballard as Seattle (Wash.) district manager of both the industrial and the mining and construction divisions. Ballard began his affiliation with Joy in 1939.

Koehring Co., Milwaukee, Wis., has appointed Western Machinery Co., Inc., Abilene, Tex., as distributor in the Texas Panhandle area. Western Machinery also has a branch at Odessa. The new distributor will handle the complete Koehring line of excavators and cranes; paving and finishing equipment; hauling units; and the Parsons line of Trenchliners, both wheel and ladder type. H. A. Swan is president of the firm, whose address is P. O. Box 5003, Abilene.

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The 72-hp Allis-Chalmers HD-6G is the only 1½-yd tractor shovel with permanently lubricated tapered roller bearing truck wheels, idlers, support rollers — gives you certified protection . . . saves greasing time, materials and money.

The PERMA-SAFE truck wheels, idlers and support rollers in the HD-6G are lubricated at the factory . . . need no further greasing regardless of conditions. PERMA-SAFE design with Positive Seals and tapered roller bearings keep lubricants in . . . dirt and moisture out . . . *for life.*

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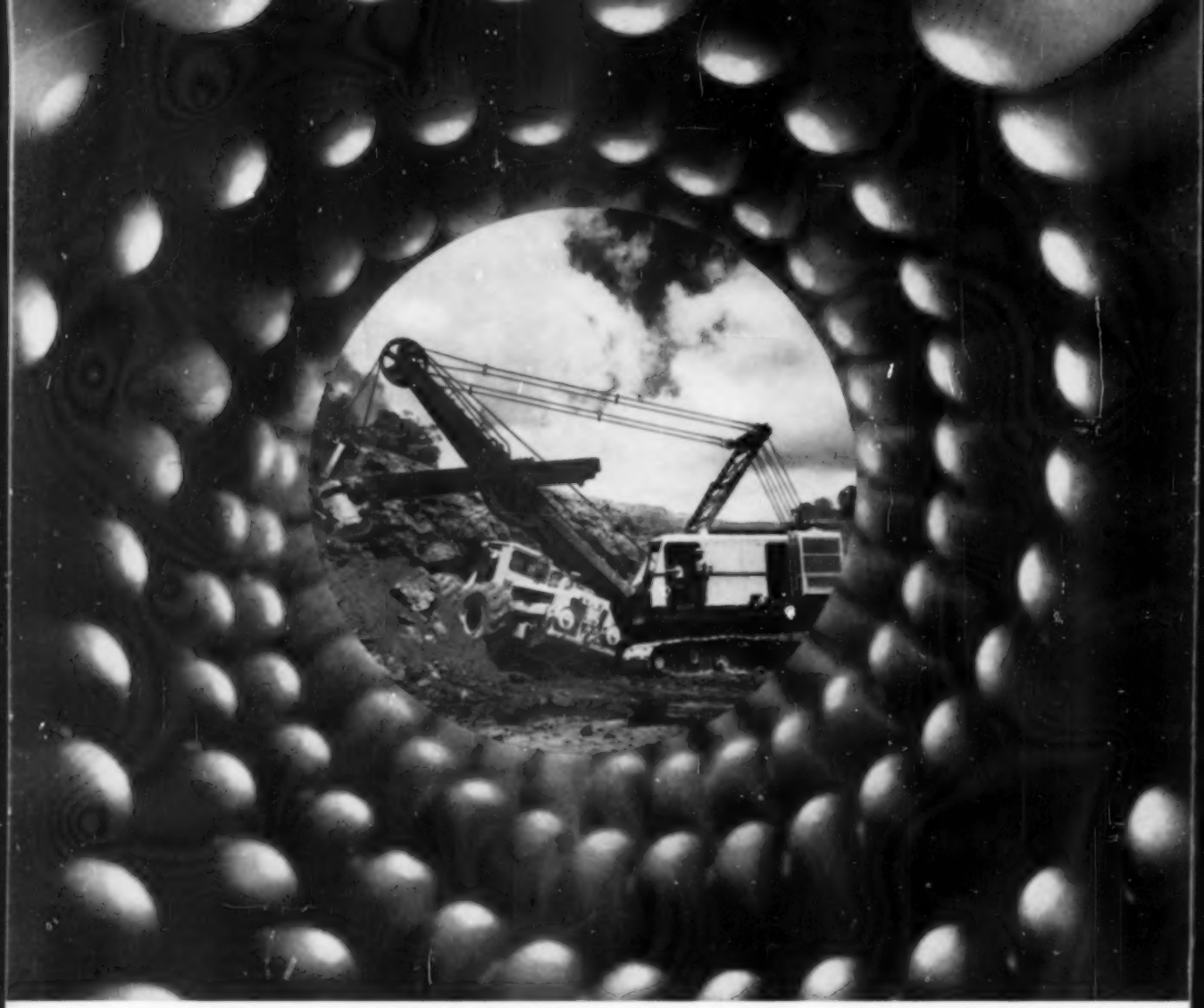

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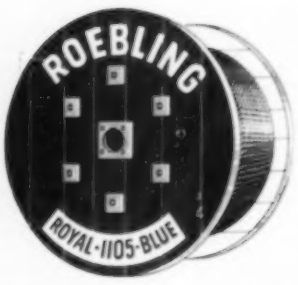

This is the inside view of Roebling Royal Blue — its core has been removed to show the uniformity and symmetry of the rope structure. It's not only what's outside that counts; it's what's *inside* as well. You see how concerned we are with internal security.

All the inspections and tests that Royal Blue goes through enable us to know that the rope we build will do what we sell it to do. These quality control measures help us — as they do you — to take the *long* view of Royal Blue. A brochure on long-lasting Royal Blue, its resistance to shock, abrasion, crushing and bending, is available on request. Ask your Roebling wire rope distributor or write to Roebling's Wire Rope Division, Trenton 2, New Jersey.

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